FURUNO

INSTALLATION MANUAL

SSB RADIOTELEPHONE

MODEL FS-1503

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FS-1503

(TENI)

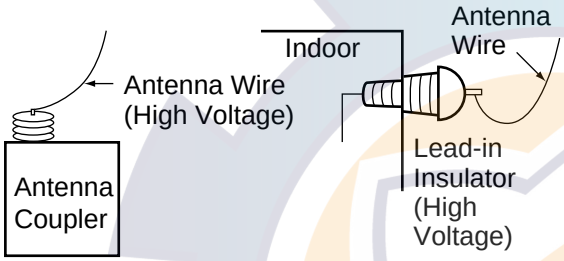
00080822400

⚠ SAFETY INSTRUCTIONS

⚠ DANGER

Never touch the SSB antenna, antenna coupler or lead-in insulator when the SSB radiotelephone is transmitting.

High voltage which will cause death or serious injury is present at the locations mentioned above when the SSB radio-telephone is transmitting.



⚠ WARNING

Do not open the cover unless totally familiar with electrical circuits and service manual.

High voltage exists inside the equipment, and a residual charge remains in capacitors several minutes after the power is turned off. Improper handling can result in electrical shock.

Turn off the power at the switchboard before beginning the installation.

Fire or electrical shock can result if the power is left on.

⚠ CAUTION

Ground the equipment to prevent electrical shock and mutual interference.

Observe the following compass safe distances:

Equipment	Standard compass	Steering compass
Transceiver	1.1 m	0.8 m
Ant. Coupler	0.6 m	0.5 m
MIC, Handset	0.6 m	0.4 m

TABLE OF CONTENTS

EQUIPMENT LISTS

Standard Set

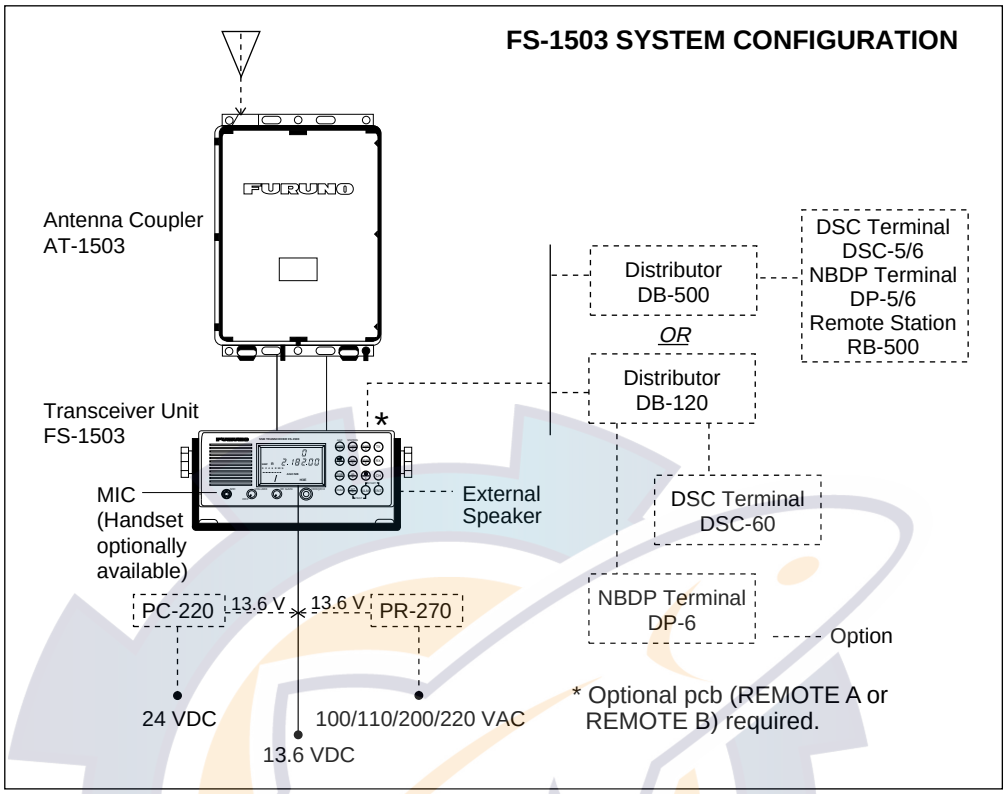
Name	Type	Code No.	Qty	Remarks
Transceiver Unit	FS-1503	—	1	With power cable
	FS-1503A	—		For U.S.A
Antenna Coupler	AT-1503	—	1	
Accessories	FP05-05000	000-050-908	1	With MIC
	FP05-05010	000-050-909	1	No MIC
Spare Parts	SP05-04400	005-939-850	1	For transceiver unit
Installation Materials	CP05-07600	000-050-906	1	With antenna coupler
	CP05-07610	000-050-907	1	No antenna coupler

Note: See packing lists on pages A-1 to A-4 for details.

Optional Equipment

Name	Type	Code No.	Qty	Remarks
AC-DC Power	PR-270	—	1	
DC-DC Converter	PC-220	—	1	
REMOTE-A Kit	OP05-82	005-939-810	1	For RS-232C
REMOTE-B Kit	OP05-83	005-939-820	1	For current loop
CONTROL Kit	OP05-41	005-920-330	1	BK connection
Bandpass Filter	SF0L04	000-116-693	1	For NBDP/DSC Terminal
SW REG Kit	OP05-84	005-939-830	1	
Dummy Load Assy.	OP05-85	005-939-840	1	
Whip Antenna	FAW-6D	000-572-128	1	
Whip Antenna	FAW6R2	000-572-108	1	
Whip Antenna	FAW-6RP2	000-572-109	1	
Whip Antenna	FAW-6R2A	000-107-921		
Whip Antenna	FAW-6RP2A	000-107-920	1	
Doublet Antenna	E22	000-050-632	1	
Single Wire Antenna	E24	000-050-634	1	
Double-span Antenna	E25	000-050-635	1	
Whip Antenna Lead-in Kit	E26	000-050-636	1	
Whip Antenna Feeder	E27	000-050-637	1	
Handset	HS-6000FZ5	000-112-623	1	
Noise-cancelling MIC	M112D 4509910	000-116-487	1	
Distributor	DB-120	—	1	
Distributor	DB-500-RS(E)	—	1	
Remote Station	RB-500	—	1	
Earth Plate	04S40801	000-572-187	1	30x1200x0.3 mm
Coaxial Cable	05S0949	000-130-485-(6,7,8)	1	20, 30, 40, 50 m
Control Cable	05S0462	000-113-361-(2,3,4)	1	20, 30, 40, 50 m
External Loudspeaker	SEM-21Q	000-144-917	1	

SYSTEM CONFIGURATION



FS-1503 system configuration

1. MOUNTING

1.1 Mounting of Transceiver Unit

General mounting considerations

The transceiver unit can be mounted on the overhead, a bulkhead, on a tabletop, or in a console (flush mounting).

When selecting a mounting location keep the following points in mind:

- Make sure the location is strong enough to support the unit under the conditions of continued vibration and shock normally encountered on the boat. Where necessary, reinforce the mounting location by lining block or doubling plate.
- Locate the unit where it is easily accessible and does not interfere with personnel or operation of other equipment; for example, ship's wheel.
- Leave enough space around the sides and rear of the unit so a service technician can access the connectors for maintenance.
- Observe the compass safe distance listed in the Safety Instructions to prevent deviation of a magnetic compass.
- If the equipment is to be installed without the hanger, leave sufficient space underneath the the equipment to allow for circulation of cooling air.

Mounting on overhead, bulkhead or tabletop

1. Using the hanger as a template, mark hole locations.
2. Fix the hanger with four sets of self-tapping screws and washers (supplied). (If extra support is required, drill six pilot holes and use bolts, nuts and flat and slotted washers instead of the tapping screws.)
3. Screw washers and knobs into the unit. Set the unit to the hanger and tighten the knobs.

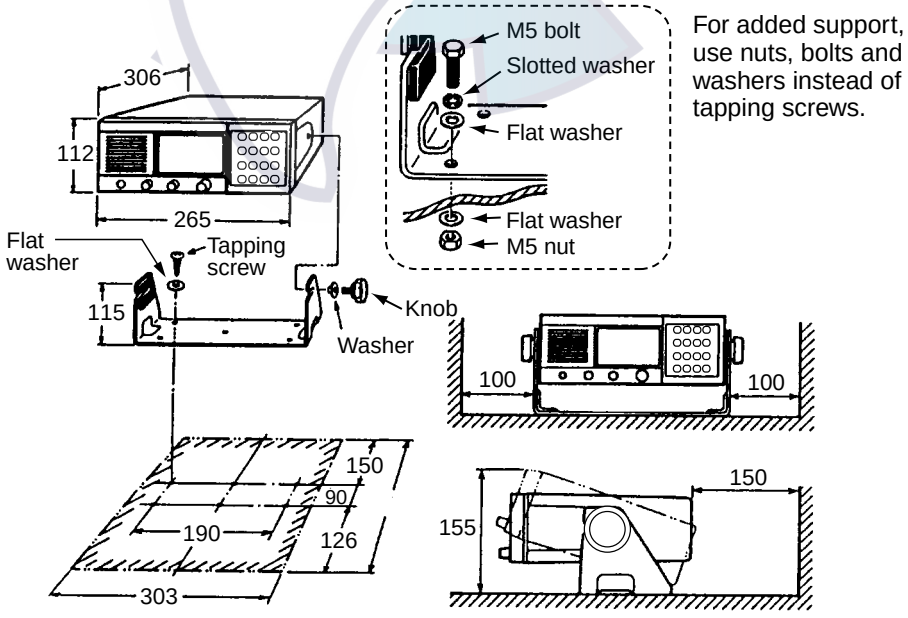


Figure 1-1 How to install the transceiver unit in the hanger

Console mounting

Mounting considerations

In addition to the general mounting considerations mentioned on the previous page, keep the following points in mind when selecting a mounting location:

- Select a place where the LCD can be easily viewed, keeping in mind the LCD viewing angle is as shown in Figure 1-2.
- Leave sufficient space around the unit to permit dispersal of heat after a long transmission.

How to mount the transceiver unit in a console

This method does not require any additional kit. However, the dimensions of the cutout must be accurate since the hanger also is installed. Prepare a cutout in the mounting location whose dimensions are as shown in Figure 1-2.

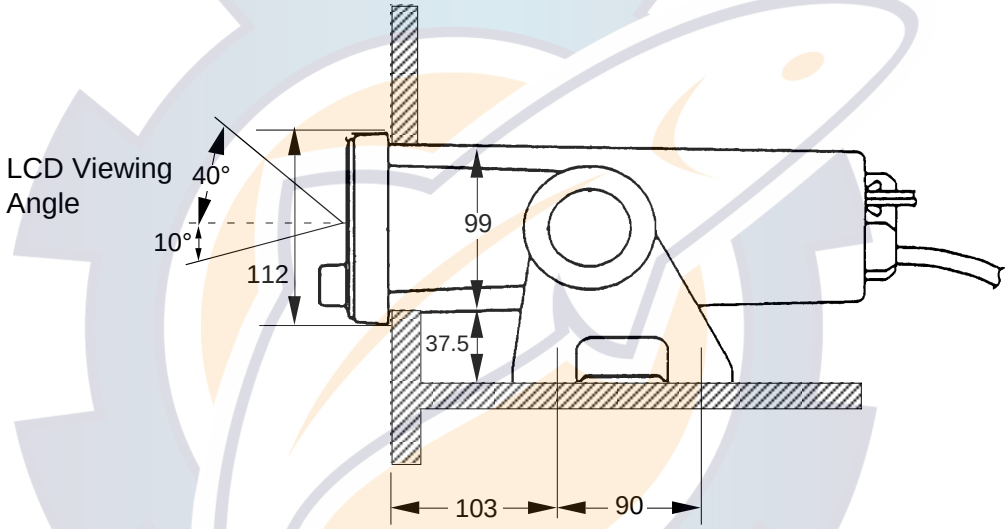


Figure 1-2 Mounting dimensions for console mounting

1.2 Mounting of Antenna Coupler

The antenna coupler is installed between the antenna and the transceiver, and tunes the antenna to the transmitter.

Mounting considerations

The splashproof construction of the antenna coupler permits installation indoors or outdoors. When selecting a location, keep in mind the following points:

- All wires from the coupler to the antenna radiate radio energy. Keep wires as short as possible and routed away from any grounded conductors such as lifelines, mast shrouds, or fittings.
- For optimum radio energy, locate the coupler close to the antenna base and as near to the ground as possible.
- **For outdoor installation,** be sure to select a place where the coupler will not take a continual soaking. If necessary, cover the top and sides with a wooden housing or by sealing any opening in the top or sides with silicone sealant.
- **For indoor installation,** locate the coupler away from GPS and SATNAV receivers and radio equipment to avoid mutual interference. The lead-in wire should be as near to the coupler as possible.
- Select a place where the coupler can be easily maintained, but where it will not interfere with crew or passengers.
- Leave sufficient space around the sides of the coupler for maintenance and checking.
- Observe the compass safe distance listed in the Safety Instructions to prevent deviation of a magnetic compass.

Mounting the antenna coupler

Mounting methods

The antenna coupler can be fixed to the floor, bulkhead, or on the overhead. For mounting on the bulkhead, floor or overhead, fix the coupler with either tapping screws or M6 nuts, bolts and washers.

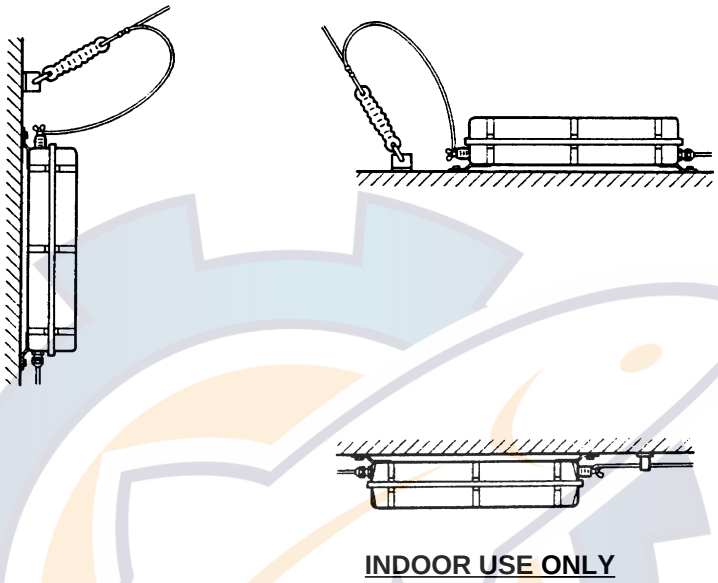
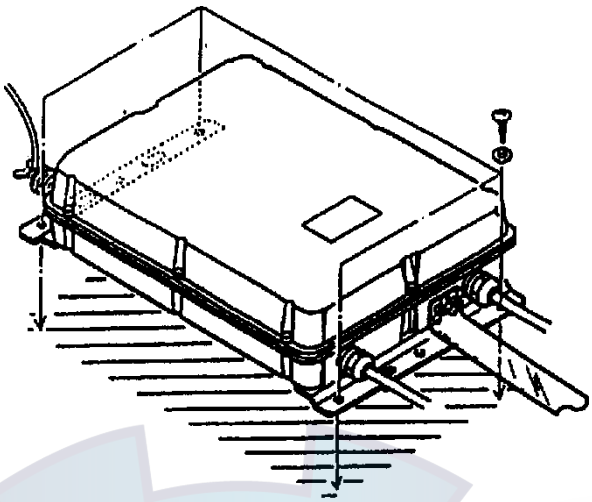
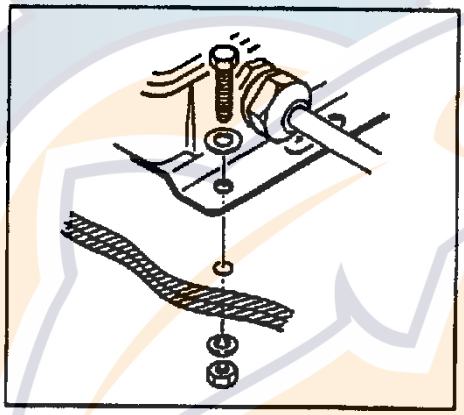


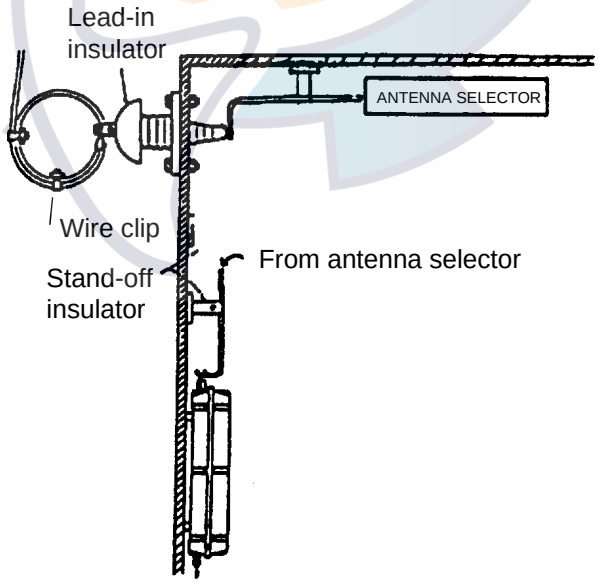
Figure 1-3 Typical antenna coupler installations

How to mount the antenna coupler





For thin bulkhead, use nuts, bolts and
and washers instead of tapping screws.



INDOOR INSTALLATION

Figure 1-4 How to mount the antenna coupler

1.3 Ground System

A good antenna can work well only when it is connected to an efficient rf ground. Without a good ground system, the full potential of this radio cannot be realized.

⚠ CAUTION

Ground the equipment to prevent electrical shock and mutual interference.

Ground for metallic hull

Run a copper strap (option or local supply) between the earth terminal on the antenna coupler and the ship's superstructure. The length of the copper strap should be as short as possible. (If the coupler is mounted on a metallic mast you can ground the copper strap to the mast; weld a stainless steel bolt to the mast and connect the copper strap there.)

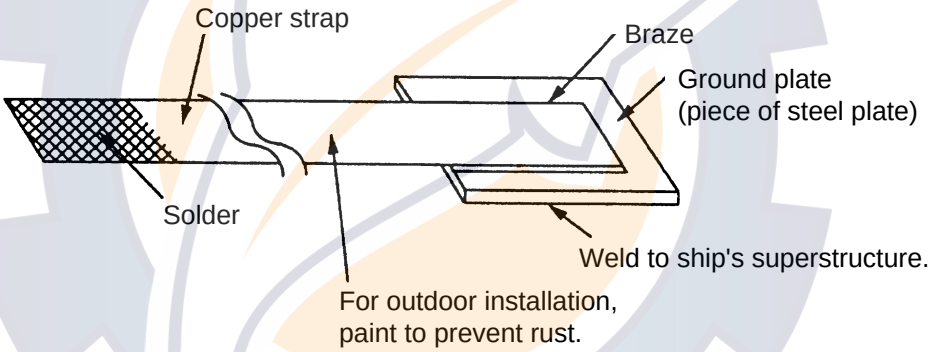


Figure 1-5 Ground for a metallic hull

Ground for non-metallic hull

Run a copper strap (option or local supply) between the ground terminal of the antenna coupler and the radio ground system. The length of the copper strap should be as short as possible.

Grounding the transceiver unit

Run the ground wire (supplied) between the transceiver unit and ship's ground, to prevent interference and protect the equipment against lightning.

1.4 Mounting of Antenna

About antennas

The antenna plays the most important role in radio communication. If it cannot receive or transmit effectively because of improper installation, even the most sophisticated transceiver will be rendered useless.

There are various types of SSB antennas. The most commonly used are a long wire and a whip. Whatever antenna is to be used, the antenna coupler can tune a long wire or whip whose total length is 6 to 15 meters. Although a longer antenna is preferable when the radio is operated only on low frequencies, use this size of antenna to ensure stable automatic tuning on all bands.

A long wire antenna is inexpensive and in general provides better performance than a whip antenna, provided the vertical part is long enough.

A whip antenna is easier than a long wire antenna to install and provides good overall coverage of most SSB frequencies. In fact, if you don't plan to venture more than 500 miles from shore and the ground system is excellent, a simple 7 m (23 feet) whip antenna will probably suffice. A whip is installed as high as possible (though height is not so critical as with VHF since SSB is frequency dependent, not range dependent), away from any nearby objects.

Mounting considerations

When selecting a mounting location, keep the following points in mind:

- The length of the vertical portion should be longer than 4 meters, and the slant angle of that part should be within 10 degrees of vertical.
- Separate the antenna as far away as possible from stays, metallic objects, direction finder antenna, Inmarsat antenna.
- Locate the insulator away from funnels and masts.
- If the antenna coupler is installed outdoors, use a lead-in insulator to make the connection. If necessary, use a high quality antenna switch and stand-off insulator.
- If the antenna is connected directly to the coupler, use a strain insulator to prevent insulator fatigue.

Typical antenna installations

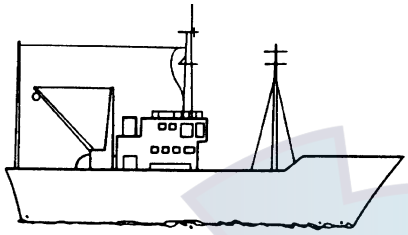
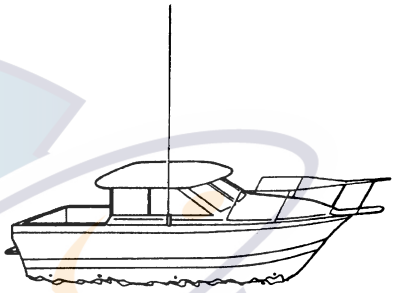
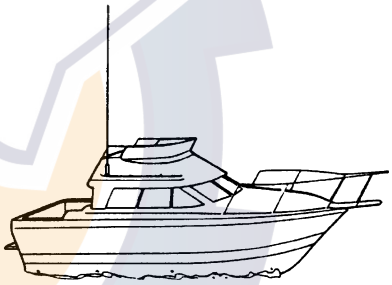
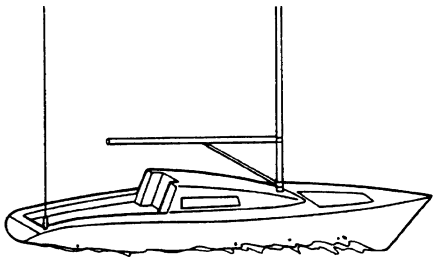
Long wire antenna	Whip antenna
Ship station On ship stations, the long wire antenna is spanned between supporting structures. The length of the horizontal wire should be between 6 and 15 meters. And the length of the vertical wire should be no less than 5 meters, the longer the better transmission.  **Sailboat** On sailboats, the long wire antenna is mounted on the backstay using special high-voltage insulators. Make sure the selected location is sufficiently apart from any metal riggings which might cause detuning. If a wire topping lift is used with an insulated backstay, special care must be taken to ensure the topping lift does not get caught in the backstay since the antenna may be shorted to ground—damaging the transmitter. 	**Power boats** On power boats, selection of a mounting location for a whip antenna is much easier, since there is no mast or deck fixture to worry about. A whip antenna can be installed almost anywhere, again the higher the better. If your boat has a flybridge, install it there. If not, install it atop the cabin. Make sure the mounting location is sufficiently apart from any nearby objects which might affect communication.   **Fishing boat/Sailboat** For whip antenna installation on a fishing boat or sailboat, the mounting location must be chosen carefully so as not to interfere with vessel operation. In case of a sailboat, locate the antenna away from the spinnaker, jib and of course the boom. Stay especially clear of the backstay. The taffrail is a good location in the event of dismasting, since the antenna won't be carried away. The best location, however, is atop the mast, the higher the better for effective communication. It is always a good idea to keep spare wire or an emergency antenna onboard in case of an emergency. 

Figure 1-6 Typical antenna installations

2. WIRING

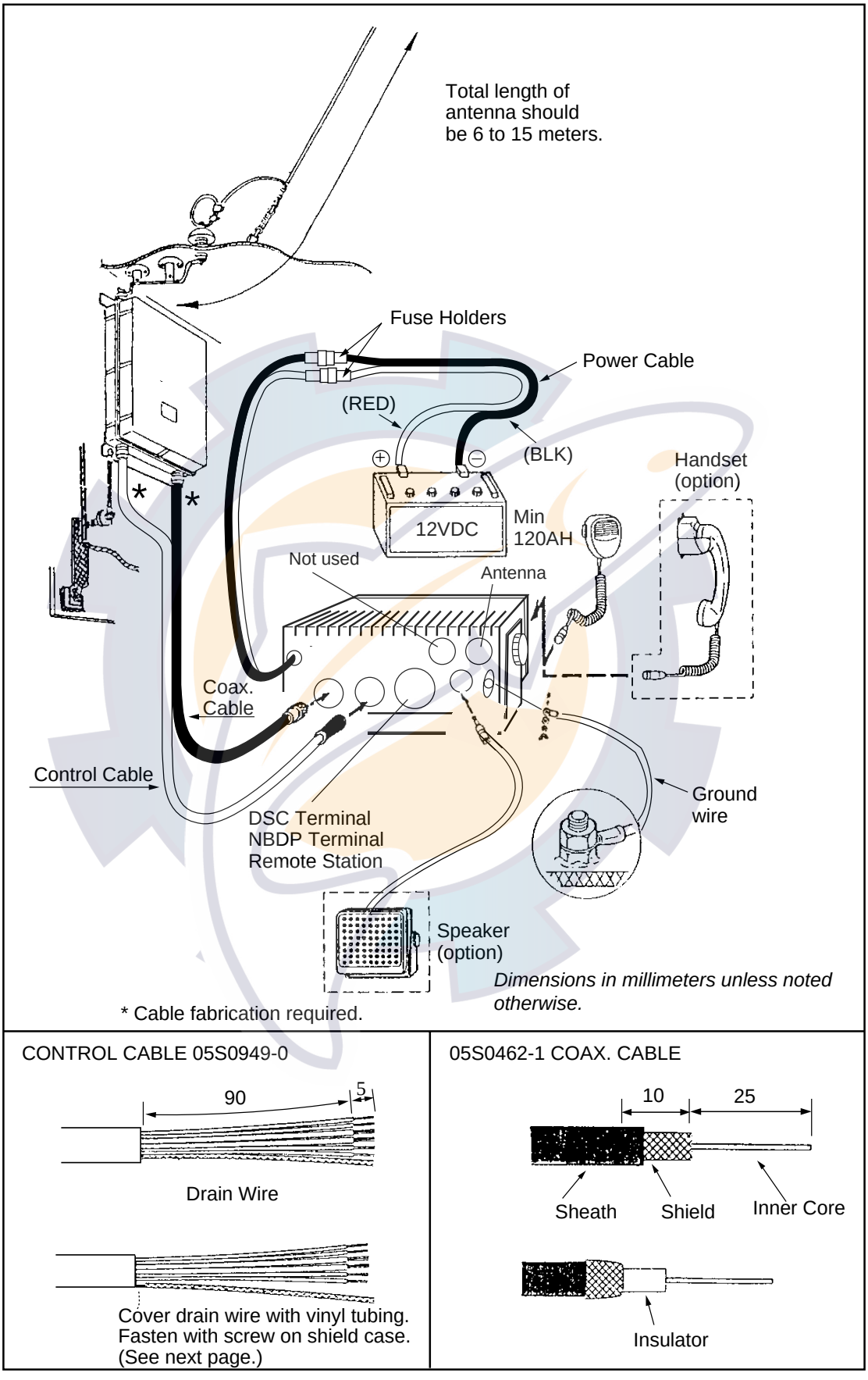


Figure 2-1 General wiring diagram

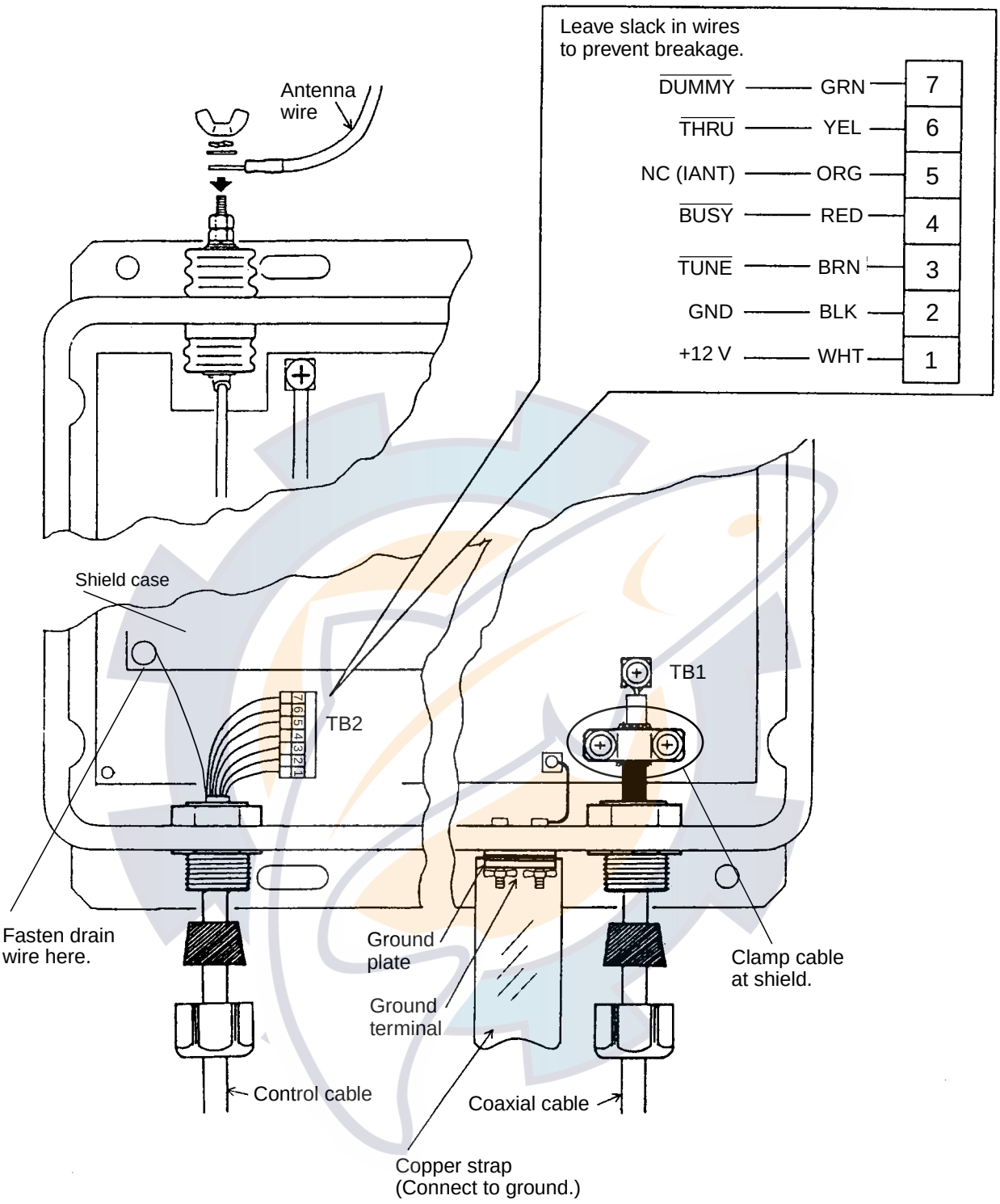


Figure 2-2 Connections inside the antenna coupler

3. WIRING OF OPTIONAL EQUIPMENT

3.1 NBDP Terminal DP-6

The NBDP Terminal connects to the REMOTE connector on the FS-1503. It has a remote control function which automatically sets class of emission and frequency data at the FS-1503.

Remarks on connection

Connect the NBDP Terminal to the FS-1503 with a 13-pair twisted cable. For the cable with no connectors, attach connector types SRCN (at FS-1503) and D-sub (at DP-6). For cable with D-sub connector, connect the SRCN connector at the FS-1503 side.

Necessary parts, interconnection

Requires REMOTE-A Kit. Install the board following the illustration on page 3-3. Note that a narrow bandpass filter is also available. For connection, interconnection diagram on page S-1.

Contents of REMOTE-A Kit OP05-82 (Code no. 005-939-810)

Name	Type	Code No.	Qty
REMOTE PCB	05P0457	005-840-980	1
Connector Assy. (REMOTE connector)	05S0928	000-130-440	1

3.2 DSC Terminal DSC-60

The DSC Terminal connects to the REMOTE connector on the FS-1503.

Remarks on connection

When both the NBDP Terminal and DSC Terminal are to be connected, connect them via the Distributor DB-500.

Necessary parts, interconnection

Requires REMOTE-A Kit. Install the board following the illustration on page 3-3. Note that a narrow bandpass filter is also available. See the interconnection diagram on page S-1.

3.3 Remote Station RB-500

Connect to the REMOTE connector on the FS-1503. If more than two RB-500s or DSC, NBDP are to be installed, connect them via the Distributor DB-500.

Necessary parts

Requires REMOTE-B Kit (current loop) for connection of a single remote station or REMOTE-A Kit when the DB-500 is connected. Install the board following the illustration on page 3-3.

Contents of REMOTE-B Kit OP05-83 (Code no. 005-939-820)

Name	Type	Code No.	Qty
REMOTE PCB	05P0458	005-840-990	1
Connector Assy. (REMOTE connector)	05S0928	000-130-440	1

3.4 Distributor DB-120/DB-500

A distributor enables connection of multiple external equipment. The DB-120 connects one NBDP Terminal and one DSC Terminal, and the DB-500 connects up to four external equipment: one NBDP terminal, one DSC terminal, and two remote stations. In either case the REMOTE-A board is also required.

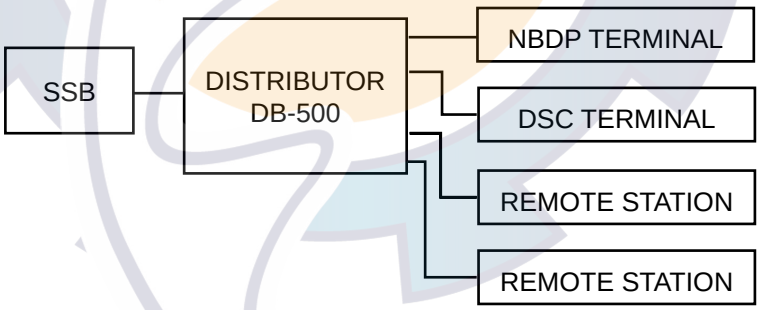
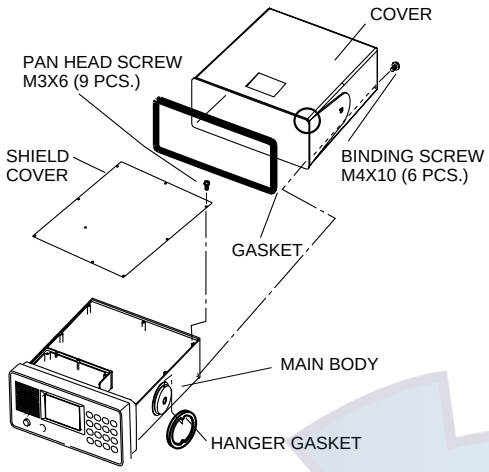


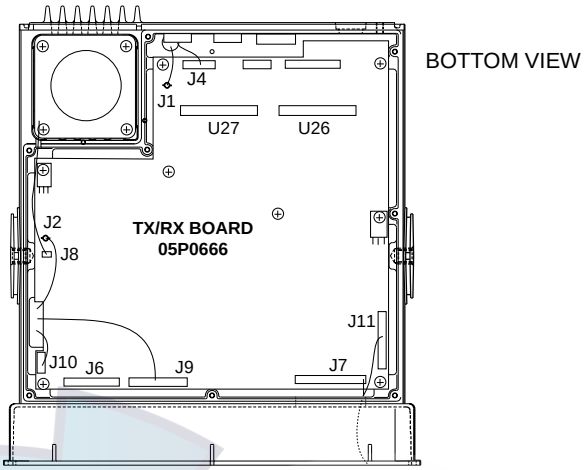
Figure 3-2 Function of the Distributor DB-500

3.5 REMOTE and CONTROL Boards

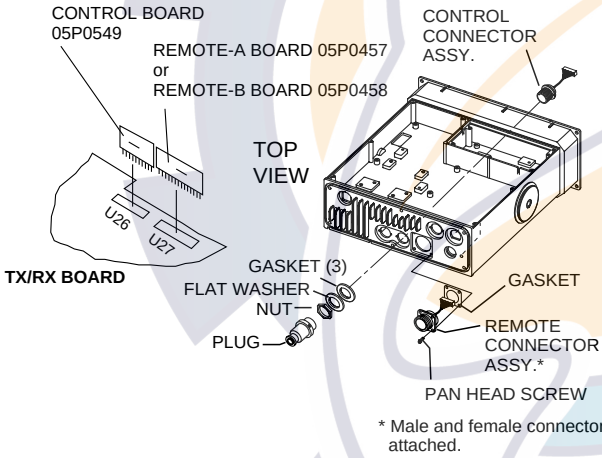
1 1.Remove cover and shield cover.



2 1. Unplug all connectors from TX/RX Board; dismount the board.

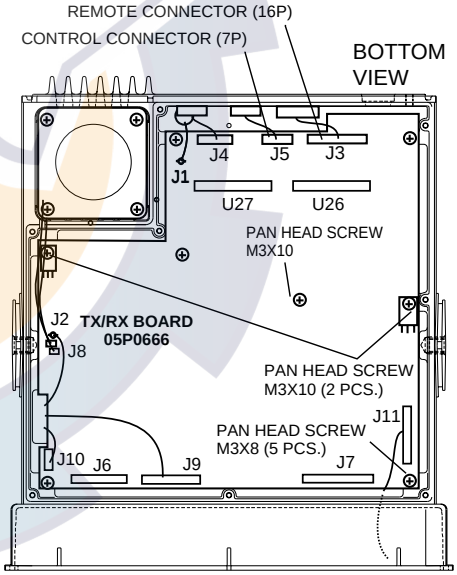


3
1. Solder CONTROL Board and/or REMOTE Board to TX/RX Board.
2. Coat left rear corner and right front corner of CONTROL and REMOTE Boards with silicone sealant (type KE-348TRTV, FURUNO code no. 000-801-041).
3. Fasten CONTROL connector and/or REMOTE connector.

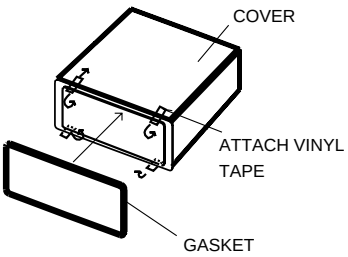


* Male and female connector attached.

4
1. Mount TX/RX Board.
2. Plug in REMOTE connector and/or CONTROL connector to TX/RX Board.
3. Attach connectors to the TX/RX Board.
4. Attach shield cover.



5
1. Attach vinyl tape (approx. 50 mm) to each outside corner of cover.
2. Insert gasket, and then fix it with vinyl tape at corners of cover.
3. Insert main body to cover.
4. Remove vinyl tape.
5. Fasten cover to main body with binding screws.



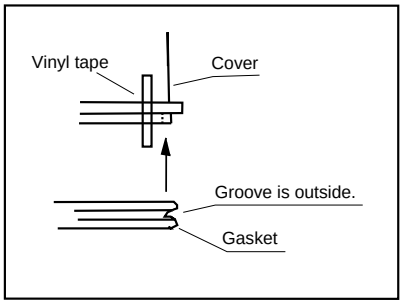


Figure 3-3 Installation of REMOTE and CONTROL boards

3.6 BK (Break-in) Connection

BK (Break-in) connection is necessary when the FS-1503 is installed together with an HF receiver or transceiver. The BK circuit functions to mute the receiver when it and the FS-1503 are operated together. With no BK connection, the receiver may generate unwanted noise or its front end may be damaged by strong signals when the radio is transmitted.

Necessary parts

The BK function requires the CONTROL Kit, which consists of the CONTROL Board, connector assy., gasket and washer. Install the board following the illustration on page 3-6. For connections, see the interconnection diagram on page S-1.

Contents of CONTROL Kit OP05-41 (Code no. 005-920-330)

Name	Type	Code No.	Qty
CONTROL PCB	05P0459	005-841-000	1
Gasket (3)	05-029-0122-3	100-087-843	1
Connector Assy.	05S0846	000-125-319	1
Washer	16.2x22.0x0.5	000-801-849	1

3.7 Telex Filter (Bandpass Filter)

The Telex filter is installed on the TX/RX Board. Install it as shown in the figure below.

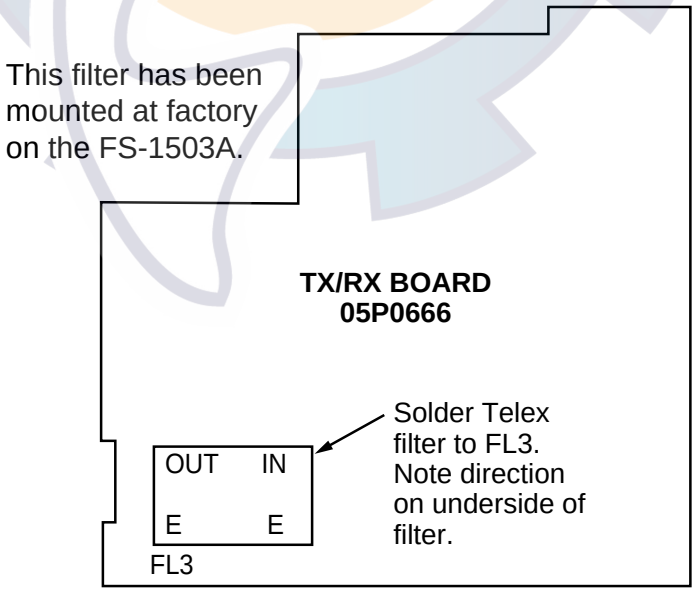


Figure 3-4 TX/RX Board, installation of Telex filter

3.8 SW Regulator (SW REG board)

The FS-1503 is supplied with negative ground. If necessary, to float the battery negative line, the SW REG Kit is available. Install the kit following the illustration below.

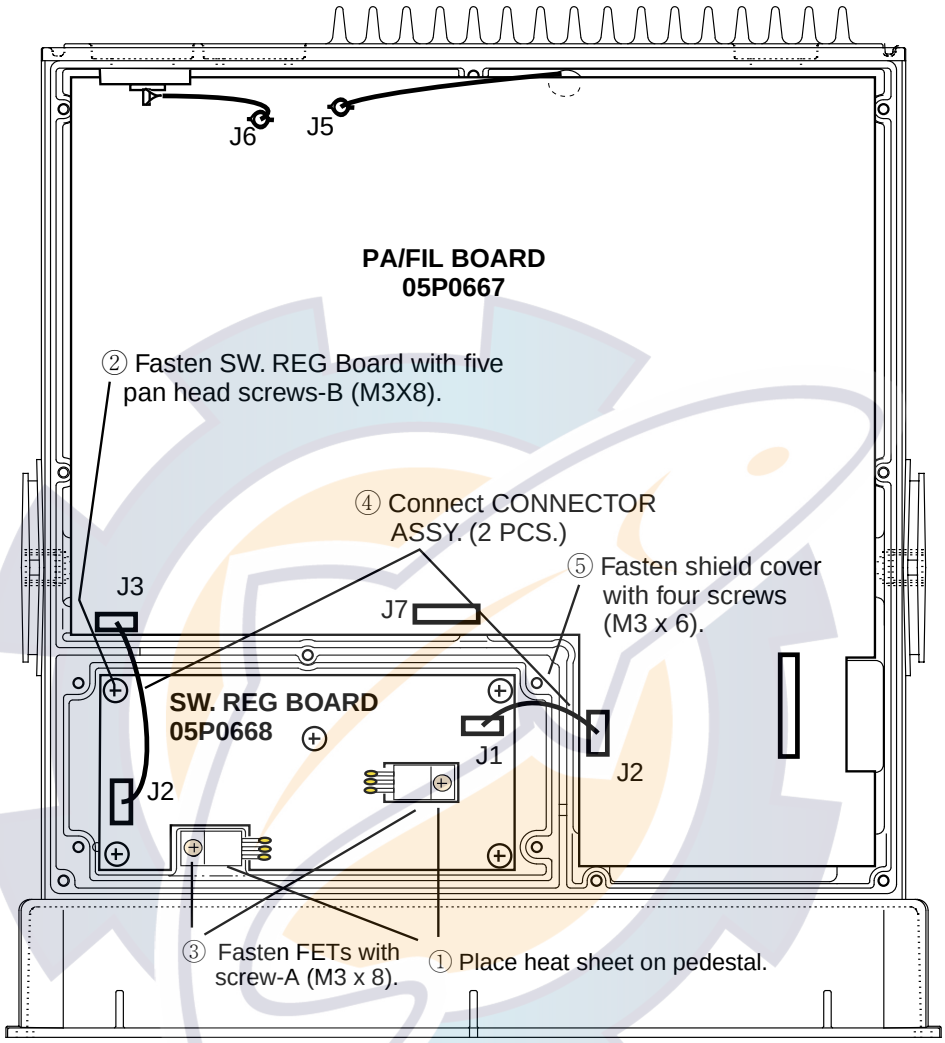


Figure 3-5 Transceiver unit, top view, installation of SW REG Board

Contents of SW REG Kit OP05-84 (Code no. 005-939-830)

Name	Type	Code No.	Qty	Remarks
SW REG	05P0668	005-940-830	1	
Connector Assy.	PH040-100	000-130-434	2	
Heat Sheet	BFG-20	000-539-110	2	
Screw	M3 x 6	000-881-103	4	For shield cover
Screw-A	M3 x 8	000-881-104	2	For FET
Screw-B	M3 x 8	000-881-404	5	For SW REG pcb
Shield Cover	05-077-1141	100-253-840	1	

3.9 Dummy Load

The dummy load enables testing of the two-tone alarm. Install the board following the figure below. **CHANGE SYSTEM SETTING 9917 to 1.**

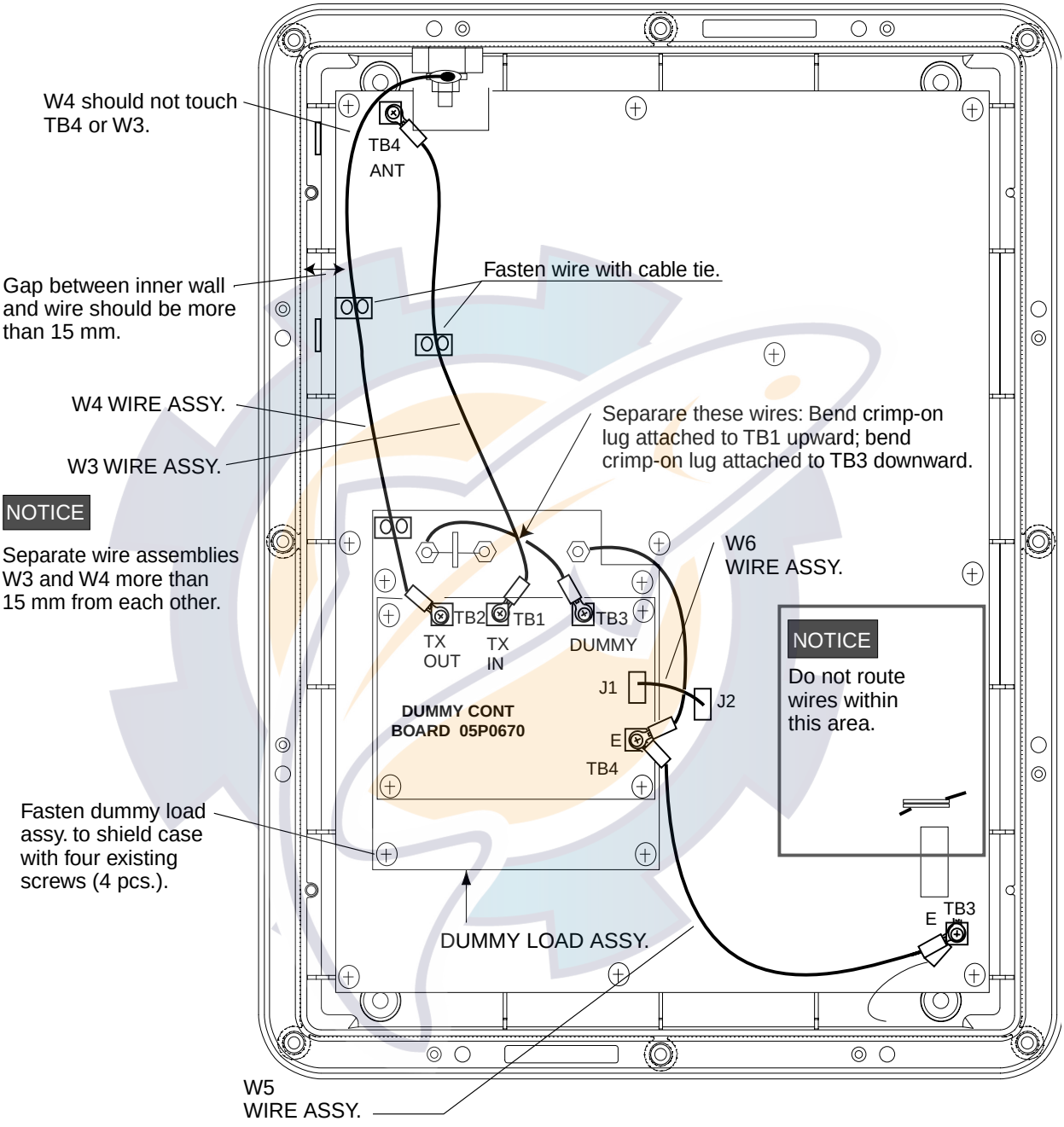


Figure 3-6 COUPLER board, installation of dummy load

3.10 Floating Ground Radiotelephone (FS-5000, etc.)

Connect the FS-1503 to the floating ground radiotelephone with a connection cable whose diameter is 0.75 mm² or larger (3C cable or equivalent).

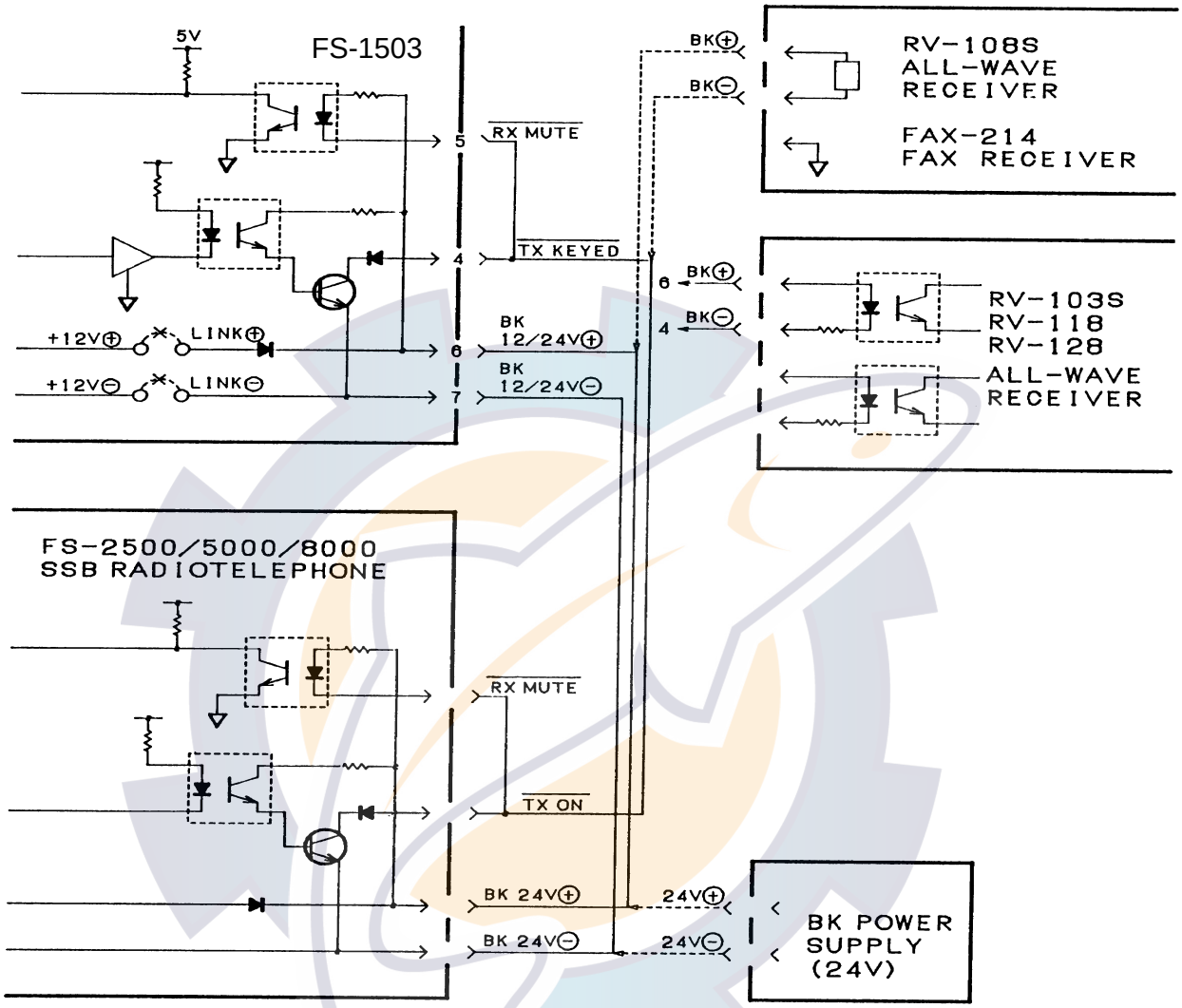


Figure 3-7 Connection of floating ground radiotelephone

4. INSTALLATION CHECK

4.1 Installation Checks

After completing the installation, check the FS-1503 and all equipment connected to it for proper connection and operation.

Visual checks

Before turning on the radiotelephone, visually check it as follows:

Antenna

1) Are fixing bolts, wire clips, shackles securely tightened?
2) Are the antenna and/or coaxial lead-in waterproofed?
3) Is the antenna wire securely connected to the coupler?
4) Make sure no mechanical stress is applied to the antenna at the connection with the coupler.

Antenna coupler

1) Is the unit perfectly grounded?
2) Is the length of the ground wire as short as possible?
3) Is the ventilation seal attached?
4) Are all wirings correctly made?

Transceiver unit

1) Is the unit grounded with the supplied ground wire? Length of the wire is as short as possible?
2) Are all wirings correctly made?
3) Are all connectors securely tightened?

Optional equipment

1) Is the unit grounded?
2) Are all wirings between the unit and the FS-1503 correctly made?
3) Are all connectors securely tightened?

Supply voltage

The transceiver unit should be off to check supply voltage. Measure supply voltage at the POWER connector. It should be 13.6 VDC ±15%.

Performance

If no problems were found in the preceding sections, then turn on the transceiver and check it for proper performance.

Receiver

1. Turn on the loudspeaker.
2. Turn off the squelch.
3. Check that all the bands can be received clearly.

If signal strength is too low or there is too much noise return to “Visual check” and recheck. Double check the antenna and ground. If there is no trouble, proceed to the next step.

Transmitter

On each band, confirm that the antenna is automatically tuned when the [TUNE/7] key or the PTT switch is pressed. (“OK” appears when tuning is successfully completed.)

Automatic tuning of the antenna should take no longer than 15 seconds. If you find a channel which takes more than 15 seconds to tune, recheck antenna length and ground.

Noise

Noise generated on board or by electrical storms can severely degrade communication. Storm-generated static, unfortunately, is impossible to suppress or eliminate. Radio traffic on lower frequency bands is sometimes completely blocked out in certain areas.

Man-made noise, however, can often be suppressed by a marine electronics technician, using special noise filtering and shielding techniques. In most cases the source of electrical noise is the ignition system, although generators, alternators, winches, pumps, radar and echo sounder can interfere with radio communication as well.

Turn on electrical equipment one by one to check for interference to the FS-1503.

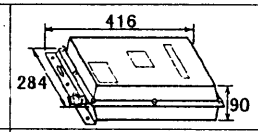
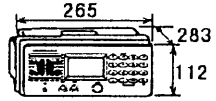
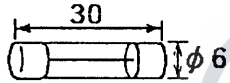
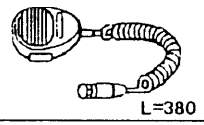
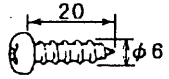
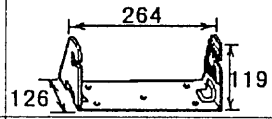
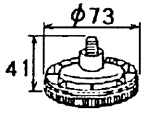
Because no two boats are built or equipped exactly alike, there is no one general noise suppressing technique that can be applied to all cases. If electrical noise interferes with SSB operation, consult a marine electronics technician.

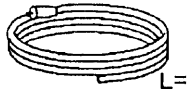
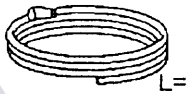
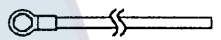
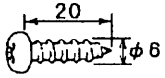
4.2 User Channel Registration

Register permitted frequencies, referring to the operator’s manual.

PACKING LIST

FS-1503-01

NAME	OUTLINE	DESCRIPTION/CODE No.	Q'TY
ユニット UNIT			
ｱﾝﾃﾅｶﾌﾟﾗ ANTENNA COUPLER		AT-1503 000-050-904	1
SSB送受信機 SSB TRANSCEIVER		FS-1503 000-050-905	1
予備品 SPARE PARTS			
ﾋｭｰｽﾞ FUSE		FGBO 30A AC125V 000-549-017	2
付属品 ACCESSORIES			
ハンドマイク HAND MICROPHONE		DM-1996FZ1 000-139-033	1
ﾅﾅﾍﾞﾀｯﾋﾟﾝUIﾈｼﾞ +TAPPING SCREW		6X20 SUS304 000-800-414	5
ﾐｶﾞｷ平座金 FLAT WASHER		M6 SUS304 000-864-129	5
ﾊﾝｶﾞｰ組品 HANGER ASSY.		FP05-05001 005-940-810	1
ﾉﾌﾞ組品 KNOB ASSY.		FP05-05002 005-940-820	2

NAME	OUTLINE	DESCRIPTION/CODE No.	Q'TY
工事材料 INSTALLATION MATERIALS			
ｹｰﾌﾞﾙ組品 CABLE ASSY.		05S0462 L-10M 000-113-360	1
ｹｰﾌﾞﾙ組品 CABLE ASSY.		05S0949 L-10M 000-130-484	1
ｱｰｽ線組品 GROUNDING WIRE		L-1M 000-140-235	1
ﾅﾅﾍﾞﾀｯﾋﾟﾝUIﾈｼﾞ +TAPPING SCREW		6X20 SUS304 000-800-414	4
ﾐｶﾞｷ平座金 FLAT WASHER		M6 SUS304 000-864-129	4

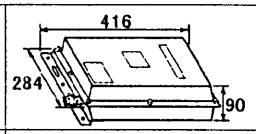
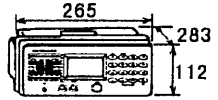
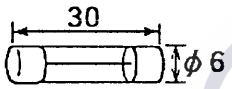
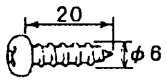
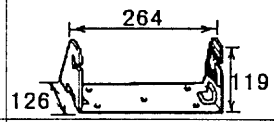
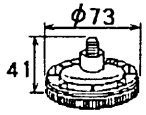
DWG NO.
C5614-Z01- B

(略図の寸法は、参考値です。 DIMENSIONS IN DRAWING FOR REFERENCE ONLY.)

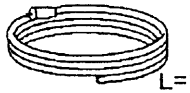
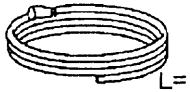
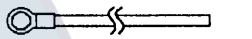
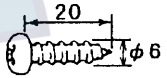
A-1

PACKING LIST

FS-1503-02

NAME	OUTLINE	DESCRIPTION/CODE No.	Q'TY
ユニット UNIT			
ｱﾝﾃﾅｶﾌﾟﾗ ANTENNA COUPLER		AT-1503 000-050-904	1
SSB送受信機 SSB TRANSCEIVER		FS-1503 000-050-905	1
予備品 SPARE PARTS			
ﾋｭｰｽﾞ FUSE		FGBO 30A AC125V 000-549-017	2
付属品 ACCESSORIES			
+ﾅﾍﾞﾀｯﾋﾟﾝUIﾈｼﾞ +TAPPING SCREW		6X20 SUS304 000-800-414	5
ﾐｶﾞｷ平座金 FLAT WASHER		M6 SUS304 000-864-129	5
ﾊﾝｶﾞｰ組品 HANGER ASSY.		FP05-05001 005-940-810	1
ﾉﾌﾞ組品 KNOB ASSY.		FP05-05002 005-940-820	2

工事材料 INSTALLATION MATERIALS

NAME	OUTLINE	DESCRIPTION/CODE No.	Q'TY
ｹｰﾌﾞﾙ組品 CABLE ASSY.		05S0462 L-10M 000-113-360	1
ｹｰﾌﾞﾙ組品 CABLE ASSY.		05S0949 L-10M 000-130-484	1
ｱｰｽ線組品 GROUNDING WIRE		L-1M 000-140-235	1
+ﾅﾍﾞﾀｯﾋﾟﾝUIﾈｼﾞ +TAPPING SCREW		6X20 SUS304 000-800-414	4
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DWG NO.
C5614-Z02- B

(略図の寸法は、参考値です。 DIMENSIONS IN DRAWING FOR REFERENCE ONLY.)

PACKING LIST

FS-1503-03

NAME	OUTLINE	DESCRIPTION/CODE No.	Q'TY
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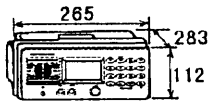
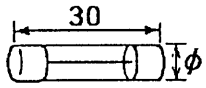
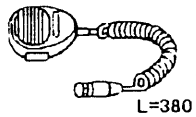
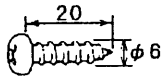
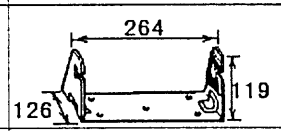
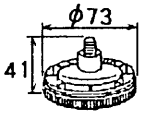
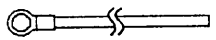
SSB送受信機 SSB TRANSCEIVER		FS-1503 000-050-905	1
予備品 SPARE PARTS			
ﾋｭｰｽﾞ FUSE		FGBO 30A AC125V 000-549-017	2
付属品 ACCESSORIES			
ﾊﾝﾄﾞﾏｲｸ HAND MICROPHONE		DM-1996FZ1 000-139-033	1
ﾅﾅﾍﾞﾀｯﾋﾟﾝUIﾈｼﾞ +TAPPING SCREW		6X20 SUS304 000-800-414	5
ﾐｶﾞｷ平座金 FLAT WASHER		M6 SUS304 000-864-129	5
ﾊﾝｶﾞｰ組品 HANGER ASSY.		FP05-05001 005-940-810	1
ﾉﾌﾞ組品 KNOB ASSY.		FP05-05002 005-940-820	2

工事材料 INSTALLATION MATERIALS

NAME	OUTLINE	DESCRIPTION/CODE No.	Q'TY
ｱｰｽ線組品 GROUNDING WIRE		L-1M 000-140-235	1

DWG NO.
C5614-Z03- B

A-3

(略図の寸法は、参考値です。 DIMENSIONS IN DRAWING FOR REFERENCE ONLY.)

PACKING LIST

FS-1503-04

NAME	OUTLINE	DESCRIPTION/CODE No.	Q'TY
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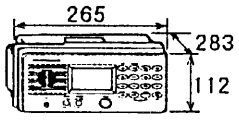
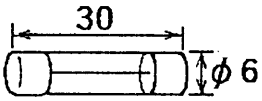
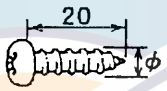
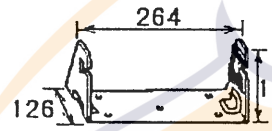
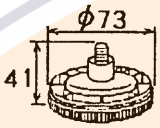
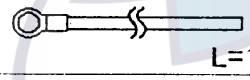
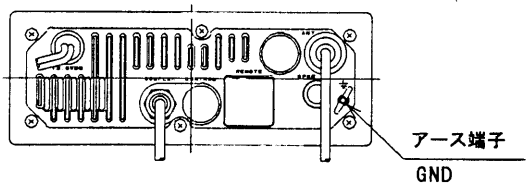
SSB送受信機 SSB TRANSCEIVER		FS-1503 000-050-905	1
予備品 SPARE PARTS			
ﾋｭｰｽﾞ FUSE		FGBO 30A AC125V 000-549-017	2
付属品 ACCESSORIES			
ﾅﾅﾍﾞﾀｯﾋﾟﾝUIﾈｼﾞ +TAPPING SCREW		6X20 SUS304 000-800-414	5
ﾐｶﾞｷ平座金 FLAT WASHER		M6 SUS304 000-864-129	5
ﾊﾝｶﾞｰ組品 HANGER ASSY.		FP05-05001 005-940-810	1
ﾉﾌﾞ組品 KNOB ASSY.		FP05-05002 005-940-820	2
工事材料 INSTALLATION MATERIALS			
ｱｰｽ線組品 GROUNDING WIRE		L-1M 000-140-235	1

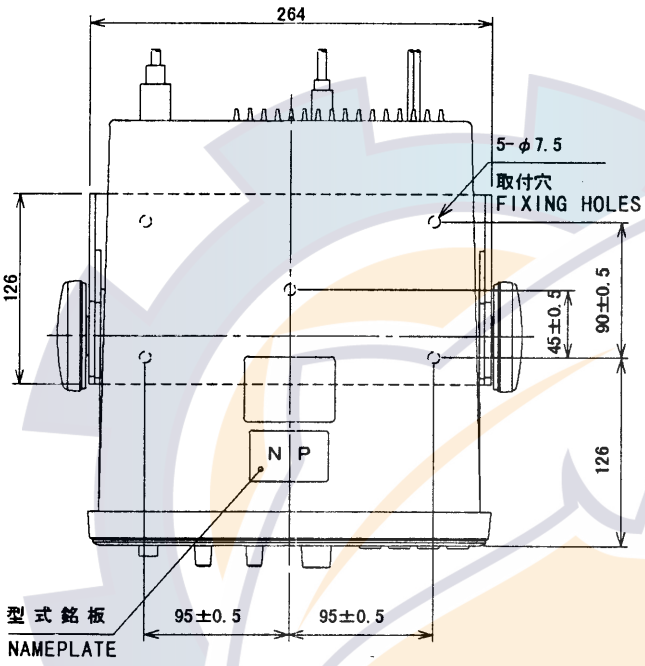
DWG NO.
C5614-Z04- B

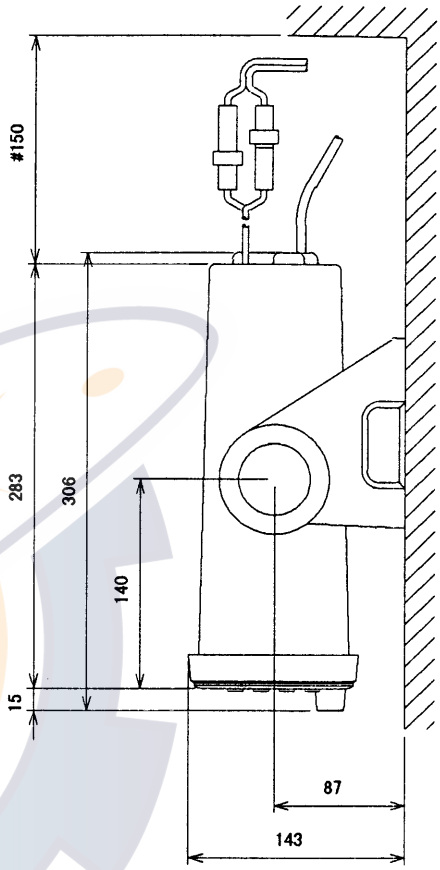
（略図の寸法は、参考値です。 DIMENSIONS IN DRAWING FOR REFERENCE ONLY.）

FURUNO



背 面 図
REAR VIEW





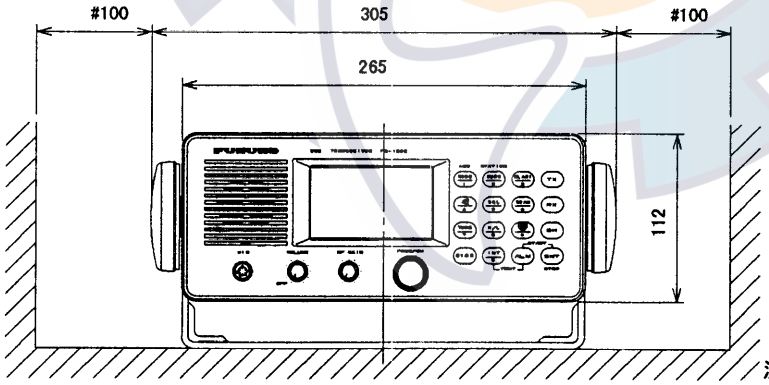


表 1
TABLE 1

範 囲 DIMENSION	公差 TOL.
L≦50	±1mm
50<L≦100	±2mm
100<L≦500	±3mm

注　記

1） 指定外寸法公差は 表1 による。
2） #：推奨するサービス空間寸法。

NOTE

1. TABLE 1 INDICATES TOLERANCE OF DIMENSIONS.
2. #: RECOMMENDED SERVICE CLEARANCE.

DRAWN Feb 24 '98 T.YAMASAKI		TITLE	FS-1503
CHECKED Feb 24 '98 K.Kusunoki		名称	SSB送受信機
APPROVED Feb 24 '98 H.Yamaguchi			外寸図
SCALE 1/5 MASS 5.7 kg		NAME	SSB TRANSCEIVER
DWG No. C5614-G01- A	05-077-1000-G1		OUTLINE DRAWING

FURUNO ELECTRIC CO., LTD.

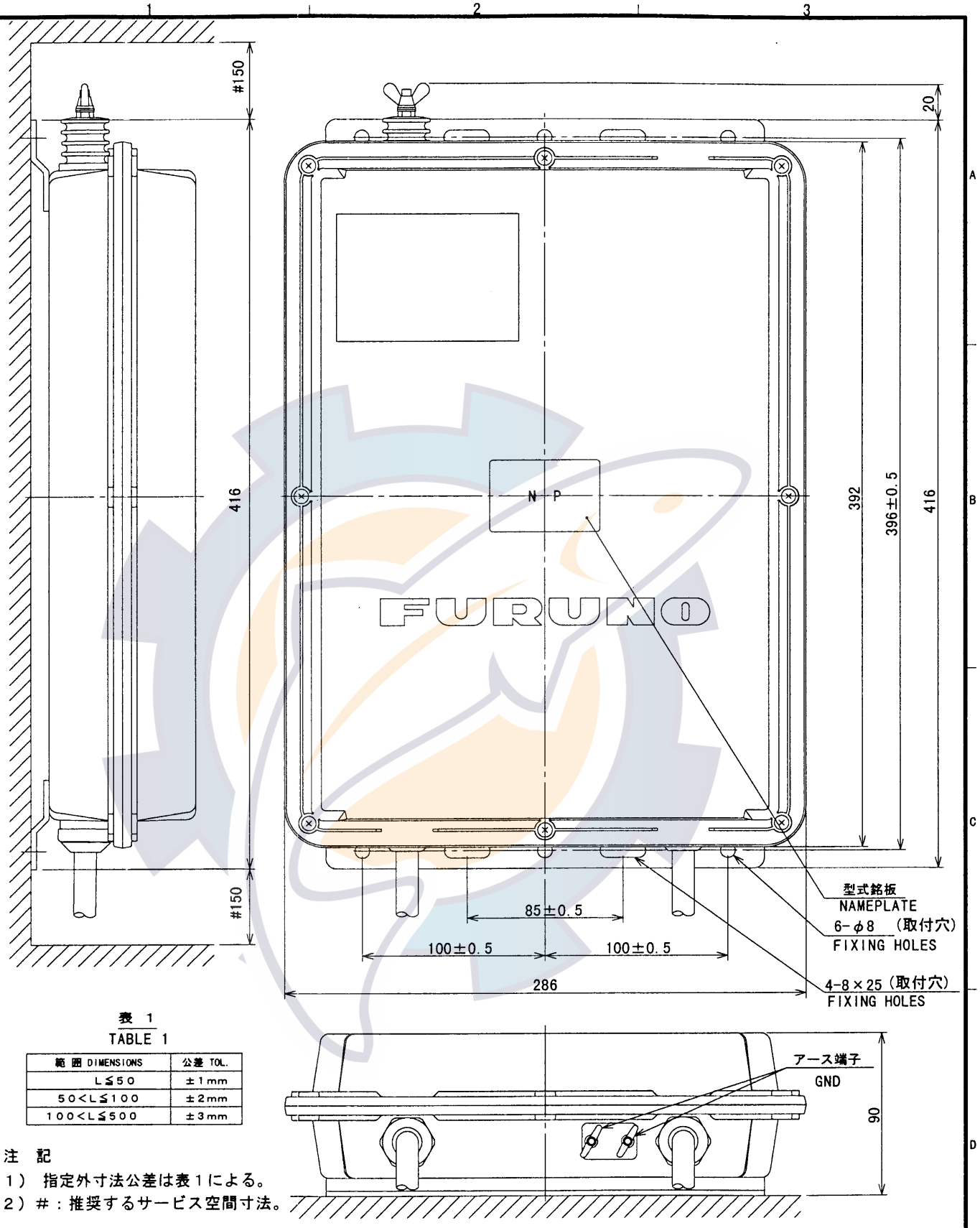


表 1
TABLE 1

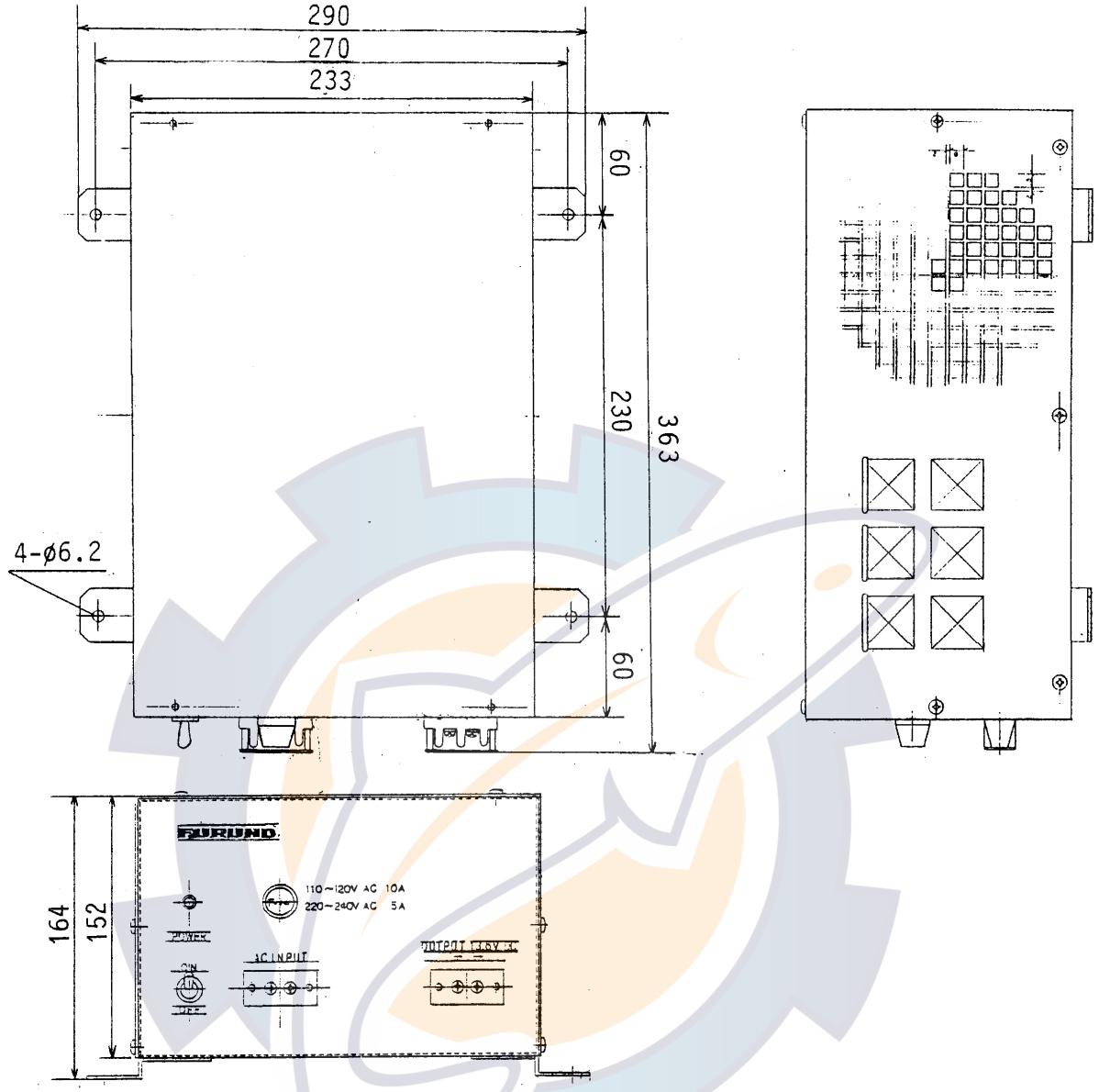
範 囲 DIMENSIONS	公差 TOL.
L≦50	±1mm
50<L≦100	±2mm
100<L≦500	±3mm

注 記
1） 指定外寸法公差は表1による。
2） # : 推奨するサービス空間寸法。

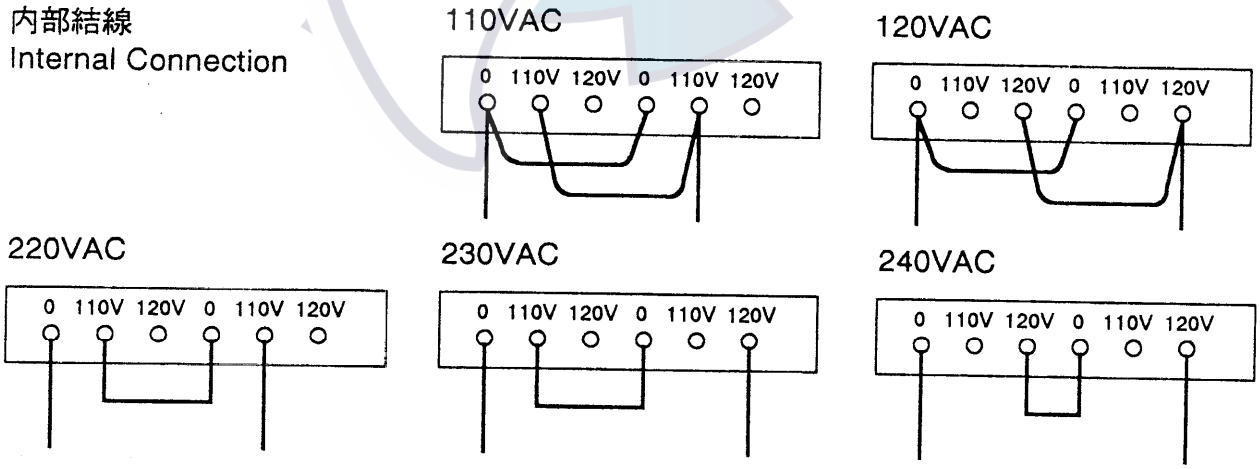
NOTE
1. TABLE 1 INDICATES TOLERANCE OF DIMENSIONS.
2. #: RECOMMENDED SERVICE CLEARANCE.

DRAWN Apr. 27'98 T.YAMASAKI			TITLE AT-1503
CHECKED Apr 27'98 K.Kusunoki			名称 アンテナカプラー
APPROVED Apr 27'98 K.Kusunoki		FS-1503	外寸図
SCALE 1/3	MASS 2.6 kg		NAME ANTENNA COUPLER
DWG No. C5614-G02- C		05-077-2000-G2	OUTLINE DRAWING

FURUNO ELECTRIC CO., LTD.



内部結線
Internal Connection



承認 APPROVED	Dec. 14. '88 T. NAKAUO	三角法 THIRD ANGLE PROJECTION		名称 TITLE	PR-270 AC 電源 POWER SUPPLY
検図 CHECKED	Dec. 14. '88 M. IKEDA	尺度 SCALE	/		
製図 DRAWN	Dec. 14. '88 S. NISHI	重量 WEIGHT	14 kg	図番 DWG. NO.	C5485 - 031 - C

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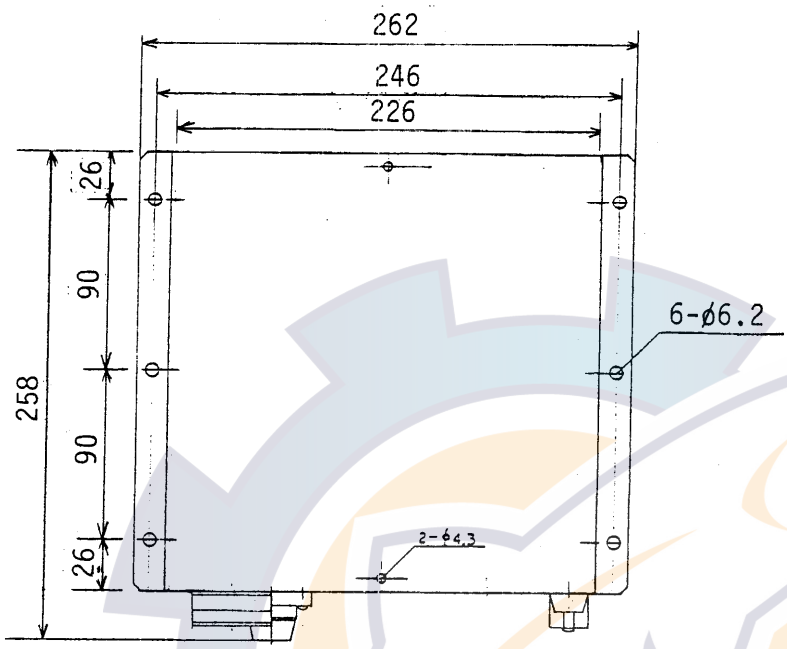

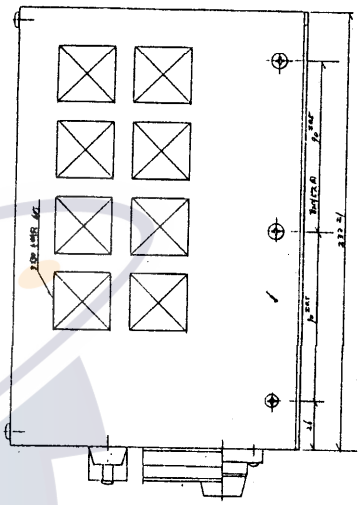

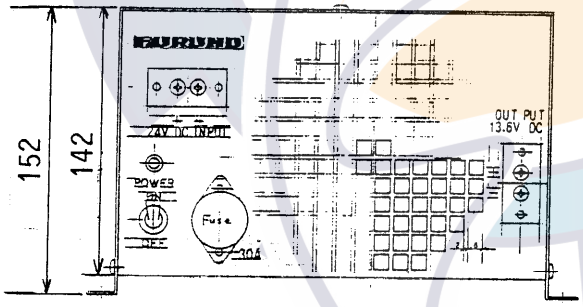

品番 ITEM	品名 NAME	材質 MATERIAL	数量 Q'TY	図番 DWG.NO.	摘要 REMARKS

承認 APPROVED	DEC・14・88 T.UEKAWA	三角法 THIRD ANGLE PROJECTION		名称 TITLE	PC-220 DC-DC コンバータ DC-DC CONVERTER
検図 CHECKED	Dec・14・'88 M.IKEDA	尺度 SCALE	≈		
製図 DRAWN	Dec・14・'88 S.NISHI	重量 WEIGHT	5 kg	図番 DWG.NO.	C5485-029-B

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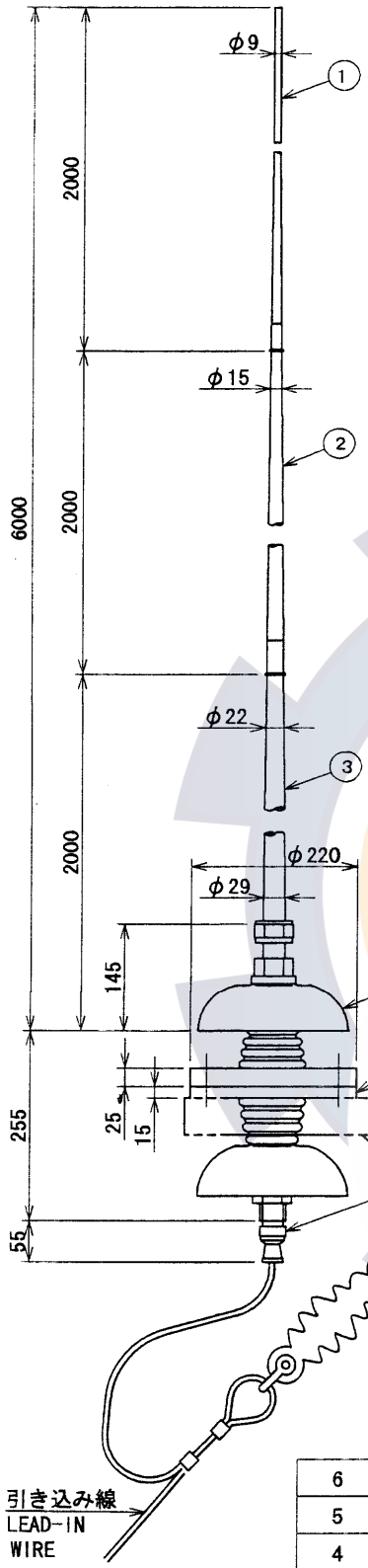
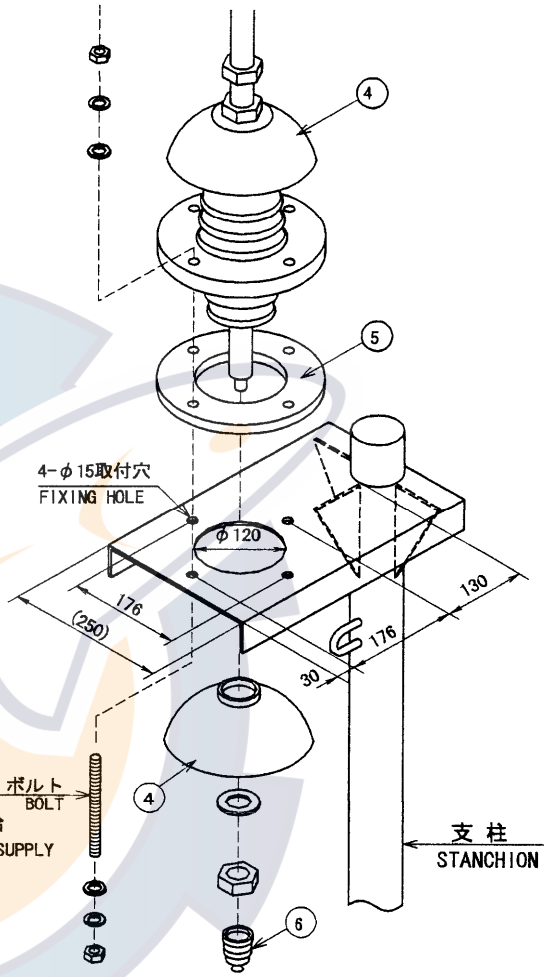


取付金具（造船所手配）装備例
FABRICATION OF MOUNTING BASE
(SHIPYARD SUPPLY)



品番 ITEM	品名 NAME	材質 MATERIAL	数量 Q'TY	図番 DWG No.	摘要 REMARKS
6	ケーブル保護金具 CABLE COVER	BRASS	1		
5	パッキン GASKET	CR	1		φ220x15t
4	碍子 INSULATOR	RESIN	1		
3	基部素子 BASE ELEMENT	FIBERGLASS	1		
2	継素子 MIDDLE ELEMENT	FIBERGLASS	1		
1	上部素子 TOP ELEMENT	FIBERGLASS	1		

DRAWN	Sep 27 '00 T.YAMASAKI
CHECKED	Sep 27 '00 Y.Kuni
APPROVED	Sep 27 '00 Y.Kuni
SCALE	1/10
MASS	10 kg ±10%
DWG. No.	C5011-034- B
TITLE	FAW-6D
名称	6 m ホイップアンテナ 外寸図
NAME	6 m WHIP ANTENNA OUTLINE DRAWING

FURUNO ELECTRIC CO., LTD.

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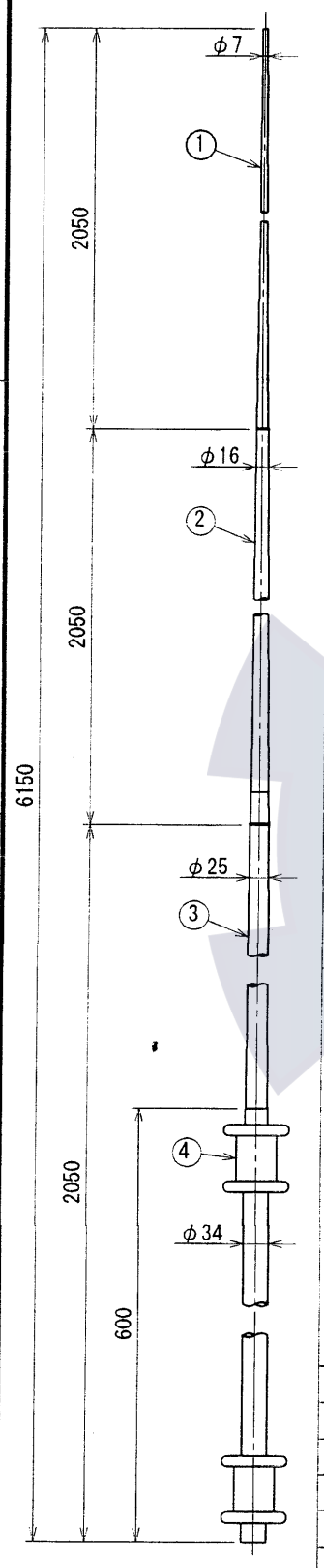
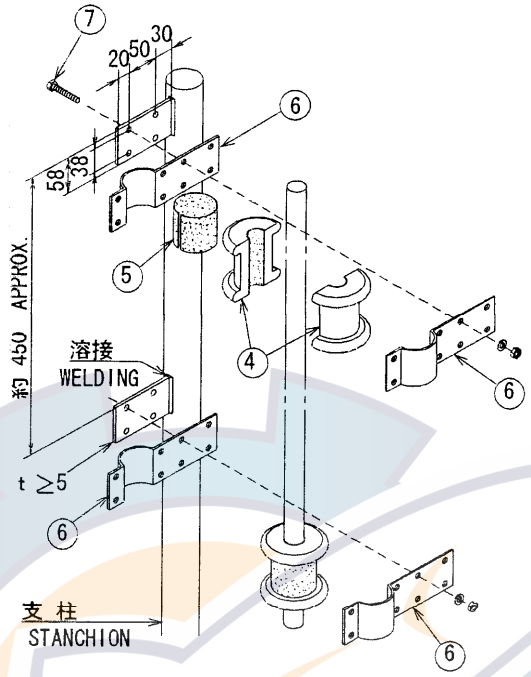
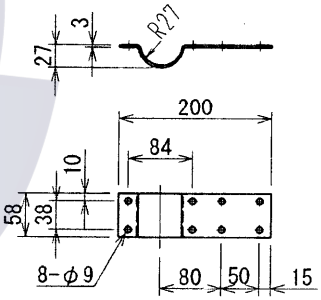
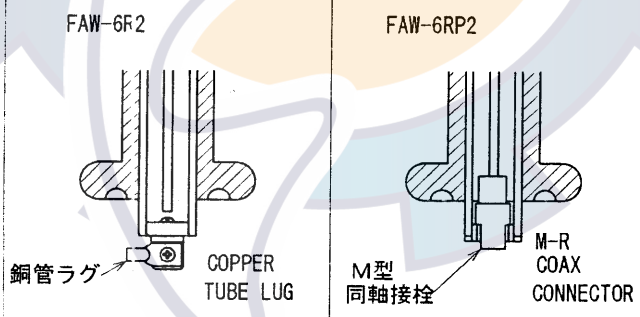




装備例 （支柱造船所手配）
EXAMPLE OF INSTLLATION

取 付 金 具
BRACKET





ITEM 品番	NAME 品名	MATERIAL 材質	Q'TY 数量	DWG No 図番	REMARKS 摘要
7	ボルト／ナット BOLT/NUT	SUS	16 PAIRS	BRACKET (000-571-590)	M8
6	取付金具 SUPPORT ARM	SUS	2 PAIRS		t=3mm
5	緩衝ゴム板 CUSHION RUBBER	ネオプレンゴム NEOPRENE	1	FAW-6R2 (000-572-109) OR FAW-6RP2 (000-572-108)	t=2mm
4	上部ホルダー UPPER HOLDER	FRP	1/2x2		
3	基部素子 LOWER ELEMENT	グラスファイバ FIBERGLASS	1		
2	継素子 MIDDLE ELEMENT	グラスファイバ FIBERGLASS	1		
1	上部素子 UPPER ELEMENT	グラスファイバ FIBERGLASS	1		

DRAWN Sep.27'00 T.YAMASAKI	TITLE	FAW-6R2/6RP2
CHECKED Sep.27'00 T.K	名称	ホイップアンテナ
APPROVED Sep.27'00 T.K		外寸図
SCALE 1/10 MASS ±10% ELEMENT:3 kg	NAME	WHIP ANTENNA
DWG. No. C5011-038- D		OUTLINE DRAWING

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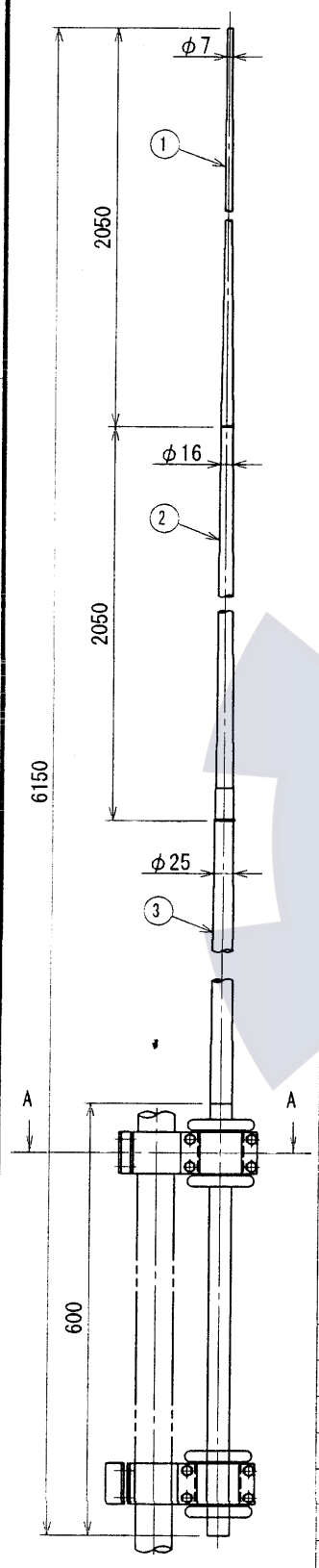
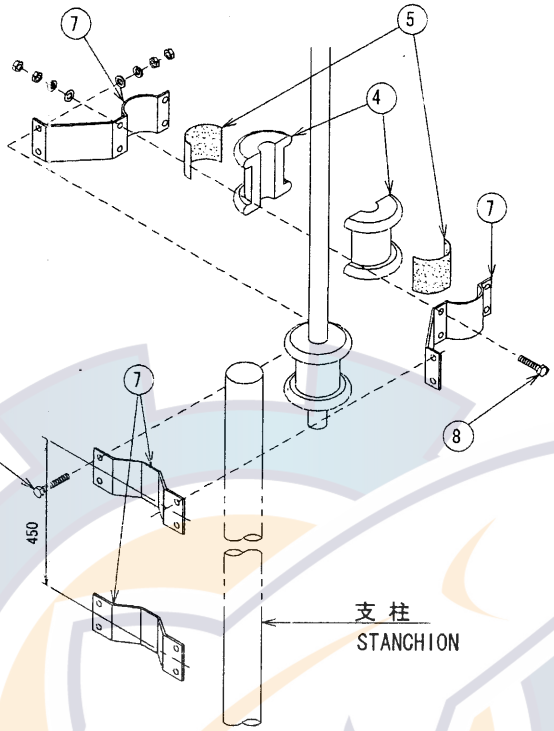
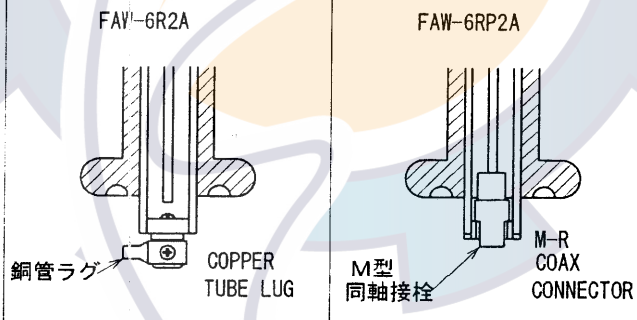
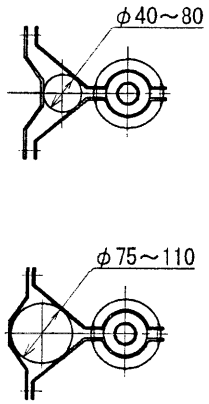


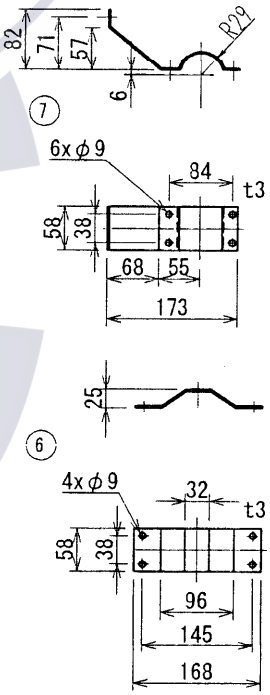


装備例 （支柱造船所手配）
EXAMPLE OF INSTALLATION



矢 視
SECTION A-A





ITEM	NAME	MATERIAL	Q'TY	DWG No.	REMARKS
8	ボルト／ナット BOLT/NUT	SUS305	8 PAIRS 8 PAIRS	AKB-6HA (000-107-691)	M8x80 M8x35
7	取付金具 SUPPORT ARM	SUS305	4		t=3mm
6	押え金具 FIXING BRACKET	SUS305	2		t=3mm
5	緩衝ゴム板 CUSHION RUBBER	ネオプレンゴム NEOPREN	1	FAW-6R2 (000-572-109) OR FAW-6RP2 (000-572-108)	
4	上部ホルダー UPPER HOLDER	FRP	1/2x2		
3	基部素子 LOWER ELEMENT	グラスファイバ FIBER GLASS	1		
2	継素子 MIDDLE ELEMENT	グラスファイバ FIBER GLASS	1		
1	上部素子 UPPER ELEMENT	グラスファイバ FIBER GLASS	1		

DRAWN	Sep 27 '00 T.YAMASAKI
CHECKED	Sep 27 '00 T.K
APPROVED	Sep 27 '00 T.K
SCALE	1/10
MASS	ELEMENT: 3 ±10% BRACKET: 1 kg
DWG. No.	C5011-040- C
TITLE	FAR-6R2A/6RP2A
名称	ホイップアンテナ 外寸図
NAME	WHIP ANTENNA OUTLINE DRAWING

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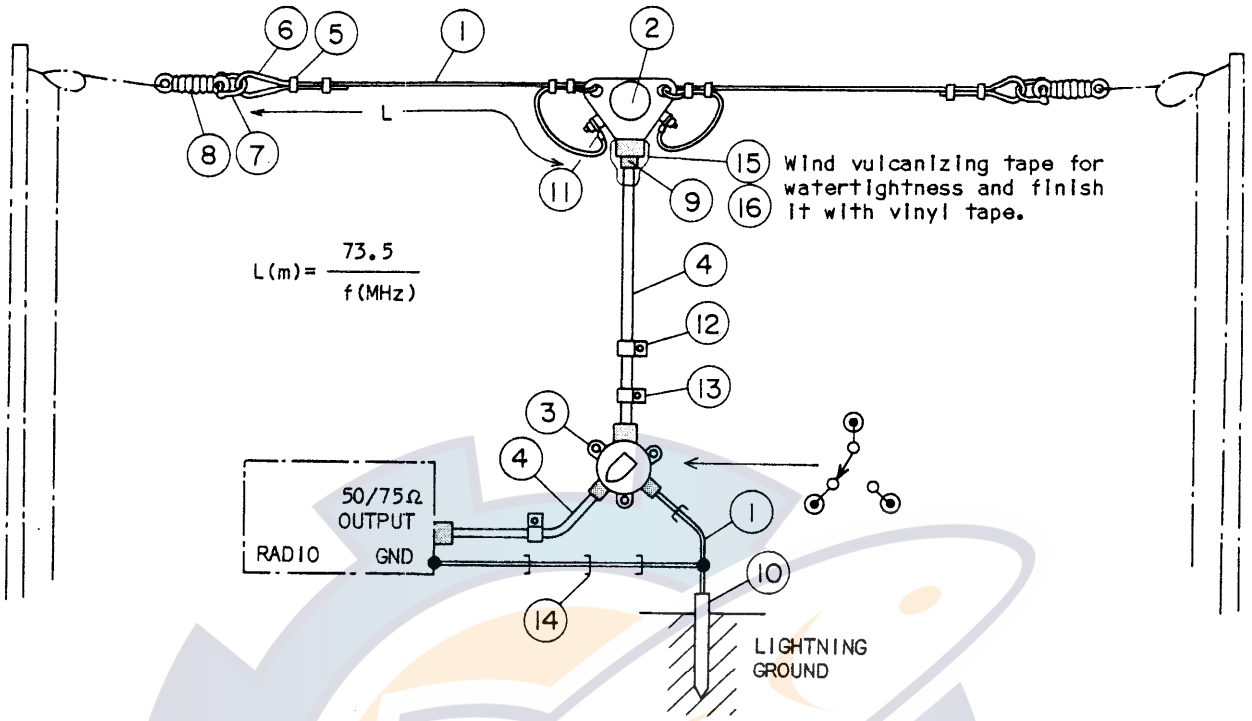

SYMBOL	PARTS NAME	TYPE	CODE NO.	REMARKS
01	ANTENNA WIRE	IV-7/1.2-H *50M*	000-550-734	
02	BALUN	BL-70A (75 OHMS)	000-572-231	
03	COAXIAL SWITCH	CH-20A (M-R)	000-479-500	
04	COAXIAL CABLE	5C2V * 30M *	000-561-263	
05	WIRE CLIP	PBC-3	000-878-933	8PCS
06	THIMBLE	NO.10	000-878-931	2PCS
07	SHACKLE	26S	000-878-932	2PCS
08	STRAIN INSULATOR	YT-180 (#18)	000-571-010	2PCS
09	COAXIAL PLUG *M TYPE*	M-P-5 FMA-4A	000-500-513	4PCS
10	EARTH ROD	WV4030	000-572-070	
11	COPPER TUBE LUG	O.D.6MM HOLE DIA 4.5	000-536-131	4PCS
12	CABLE HOLDER	HP-5N	000-570-030	10PCS
13	WOOD SCREW	3.8X13	000-861-750	10PCS
14	STAPLE	WV2107HP	000-878-912	10PCS
15	VULCANIZING TAPE	F-CO NO.2	000-835-034	
16	VINYL TAPE	0.2X19X10000MM BLUE	000-835-030	

承認 APPROVED	AUG. 12 '82	三角法 THIRD ANGLE PROJECTION		名称 TITLE	E-22 DOUBLET ANTENNA KIT (Code No. 000-050-632)
検図 CHECKED	Aug. 11 '82	尺度 SCALE	/		
製図 DRAWN	Aug. 11 '82	重量 WEIGHT	kg	図番 DWG. NO.	E5023-034-A

FURUNO ELECTRIC CO., LTD.

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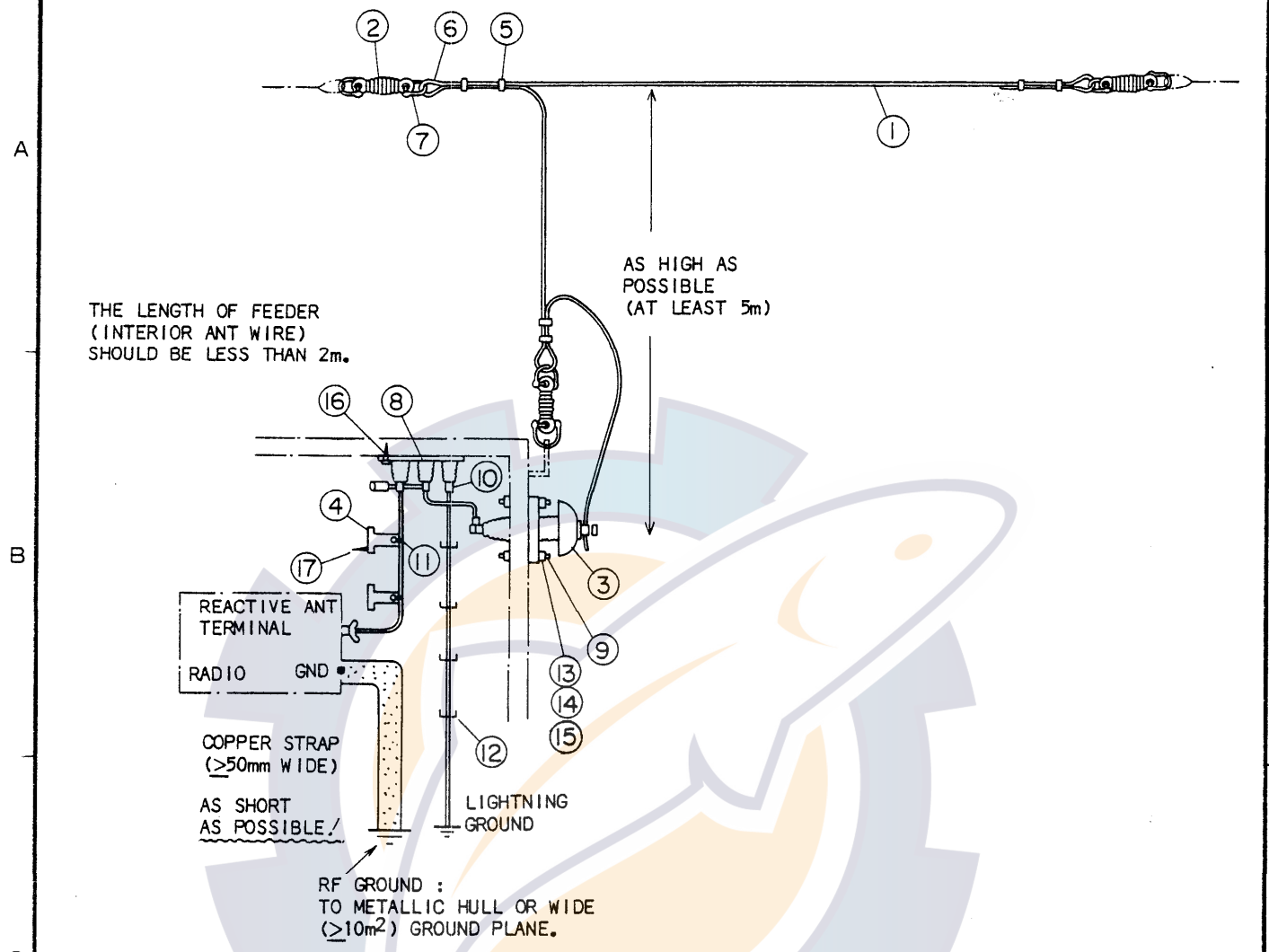
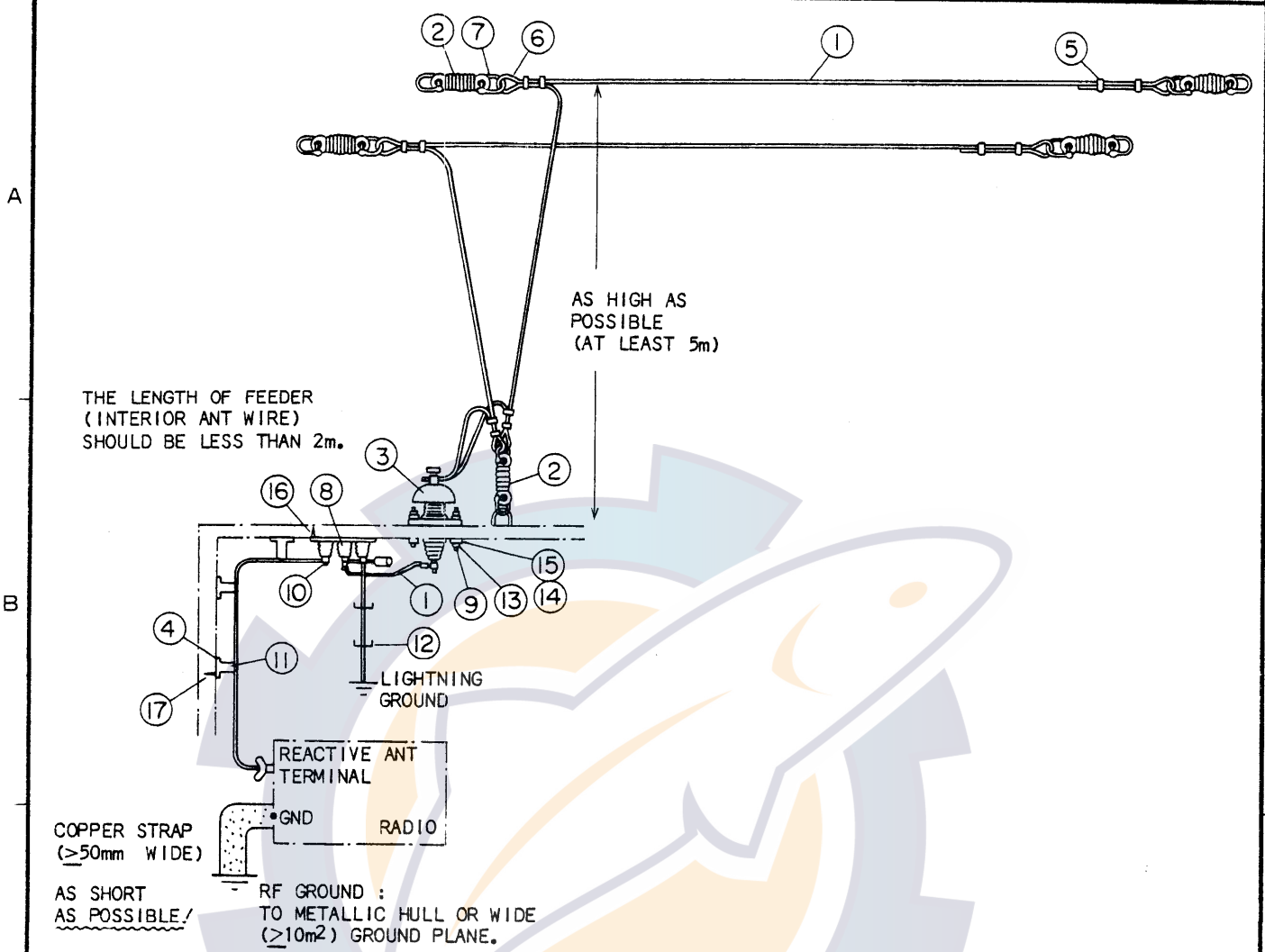


SYMBOL	PARTS NAME	TYPE	CODE NO.	REMARKS
01	ANTENNA WIRE	IV-7/1.2-H *30M*	000-550-733	
02	STRAIN INSULATOR	YT-180 (#18)	000-571-010	3PCS
03	LEAD-IN INSULATOR	YA-150	000-571-431	
04	STAND-OFF INSULATOR	YS-70	000-571-470	4PCS
05	WIRE CLIP	PBC-3	000-878-933	6PCS
06	THIMBLE	NO.10	000-878-931	3PCS
07	SHACKLE	26S	000-878-932	6PCS
08	ANTENNA SWITCH	AS1-2	000-572-020	
09	THREADED ROD	M8 X 300	000-862-631	3PCS
10	COPPER TUBE LUG	O.D.6MM HOLE DIA 4.5	000-536-131	4PCS
11	FIXING STRAP	CV-150	000-570-325	8PCS
12	STAPLE	WV2107HP	000-878-912	8PCS
13	HEXAGONAL NUT	M8	000-863-297	6PCS
14	SPRING WASHER	M8	000-864-294	6PCS
15	FLAT WASHER	M8	000-864-051	6PCS
16	WOOD SCREW	3.8X13	000-861-750	4PCS
17	WOOD SCREW	4.5 X 25	000-861-753	8PCS
18	VINYL TAPE	0.2X19X10000MM BLUE	000-835-030	

承認 APPROVED	Aug. 12. '82 K. Kawata	三角法 THIRD ANGLE PROJECTION		名称 TITLE	E-24 SINGLE WIRE ANTENNA KIT (Code No. 000-050-634)
検図 CHECKED	Aug. 11. '82	尺度 SCALE	/		
製図 DRAWN	Aug. 11. '82 M. Ohata	重量 WEIGHT	kg	図番 DWG. NO.	E5023-035-A

FURUNO ELECTRIC CO., LTD.

FURUNO



SYMBOL	PARTS NAME	TYPE	CODE NO.	REMARKS
01	ANTENNA WIRE	IV-7/1.2-H *50M*	000-550-734	
02	STRAIN INSULATOR	YT-180 (#18)	000-571-010	5PCS
03	LEAD-IN INSULATOR	YA-150	000-571-431	
04	STAND-OFF INSULATOR	YS-70	000-571-470	4PCS
05	WIRE CLIP	PBC-3	000-878-933	12PCS
06	THIMBLE	NO.10	000-878-931	6PCS
07	SHACKLE	26S	000-878-932	10PCS
08	ANTENNA SWITCH	AS1-2	000-572-020	
09	THREADED ROD	M8 X 300	000-862-631	3PCS
10	COPPER TUBE LUG	O.D.6MM HOLE DIA 4.5	000-536-131	8PCS
11	FIXING STRAP	CV-150	000-570-325	8PCS
12	STAPLE	WV2107HP	000-878-912	10PCS
13	HEXAGONAL NUT	M8	000-863-297	6PCS
14	SPRING WASHER	M8	000-864-294	6PCS
15	FLAT WASHER	M8	000-864-051	6PCS
16	WOOD SCREW	3.8X13	000-861-750	8PCS
17	WOOD SCREW	4.5 X 25	000-861-753	8PCS
18	VINYL TAPE	0.2X19X10000MM BLUE	000-835-030	

承認 APPROVED	AUG. 12. '82 K. Furuno	三角法 THIRD ANGLE PROJECTION		名称 TITLE	E-25 DOUBLE-SPAN ANTENNA KIT (Code No. 000-050-635)
検図 CHECKED	Aug. 11. '82	尺度 SCALE	/		
製図 DRAWN	Aug. 11. '82 M. Furuno	重量 WEIGHT	kg	図番 DWG. NO.	E5023-036-A

FURUNO ELECTRIC CO., LTD.

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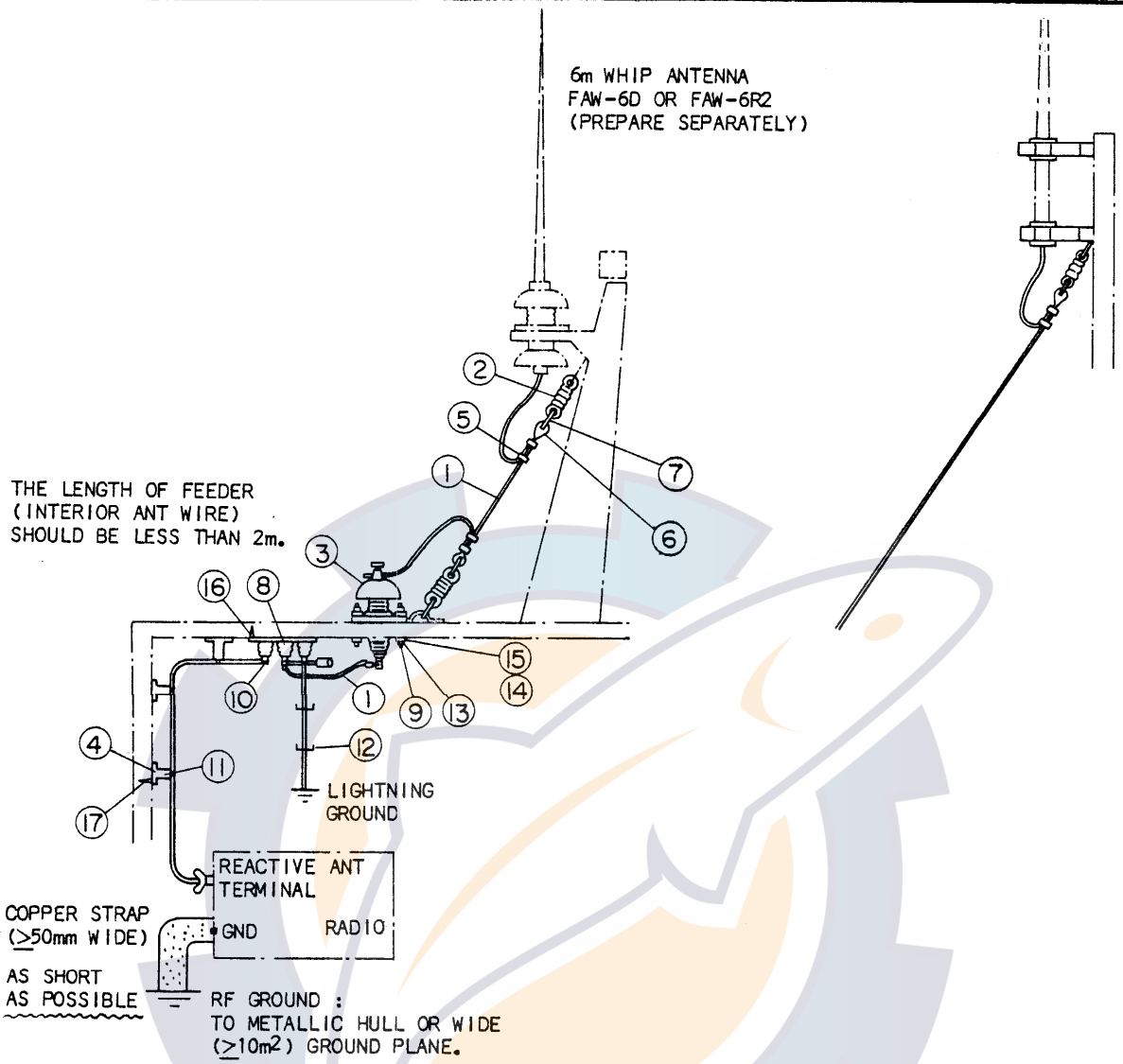

SYMBOL	PARTS NAME	TYPE	CODE NO.	REMARKS
01	ANTENNA WIRE	IV-7/1.2-H *15M*	000-550-732	
02	STRAIN INSULATOR	YT-180 (#18)	000-571-010	2PCS
03	LEAD-IN INSULATOR	YA-150	000-571-431	
04	STAND-OFF INSULATOR	YS-70	000-571-470	4PCS
05	WIRE CLIP	PBC-3	000-878-933	4PCS
06	THIMBLE	NO.10	000-878-931	2PCS
07	SHACKLE	26S	000-878-932	4PCS
08	ANTENNA SWITCH	AS1-2	000-572-020	
09	THREADED ROD	M8 X 300	000-862-631	3PCS
10	COPPER TUBE LUG	O.D.6MM HOLE DIA 4.5	000-536-131	2PCS
11	FIXING STRAP	CV-150	000-570-325	8PCS
12	STAPLE	WV2107HP	000-878-912	10PCS
13	HEXAGONAL NUT	M8	000-863-297	6PCS
14	SPRING WASHER	M8	000-864-294	6PCS
15	FLAT WASHER	M8	000-864-051	6PCS
16	WOOD SCREW	3.8X13	000-861-750	4PCS
17	WOOD SCREW	4.5 X 25	000-861-753	8PCS
18	VINYL TAPE	0.2X19X10000MM BLUE	000-835-030	

承認 APPROVED	AUG. 12. '82 K. Furuno	三角法 THIRD ANGLE PROJECTION		名称 TITLE	E-26 WHIP ANTENNA LEAD-IN KIT (Code No. 000-050-636)
検図 CHECKED	Aug. 11. '82	尺度 SCALE	/		
製図 DRAWN	Aug. 11. '82 M. Meoka	重量 WEIGHT	kg	図番 DWG. NO.	E5023-037-B

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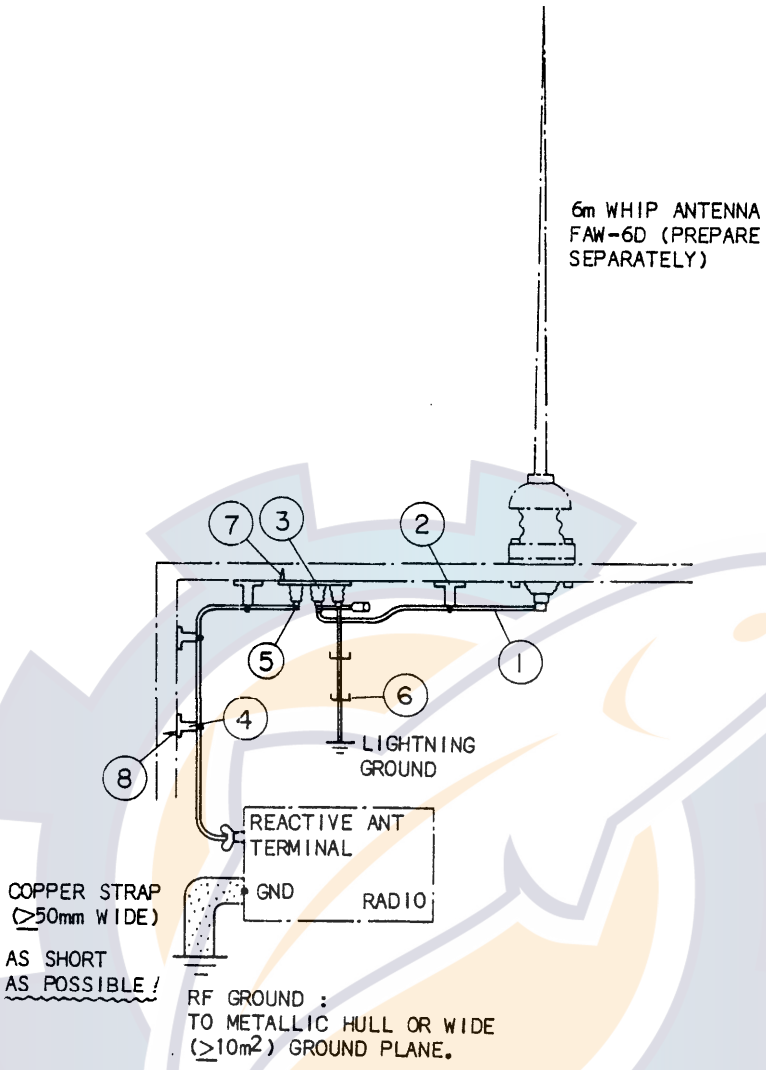
FURUNO

D-12



SYMBOL	PARTS NAME	TYPE	CODE NO.	REMARKS
01	ANTENNA WIRE	IV-7/1.2-H *7.5M*	000-550-731	
02	STAND-OFF INSULATCR	YS-70	000-571-470	4PCS
03	ANTENNA SWITCH	AS1-2	000-572-020	
04	FIXING STRAP	CV-150	000-570-325	8PCS
05	COPPER TUBE LUG	O.D.6MM HOLE DIA 4.5	000-536-131	4PCS
06	STAPLE	WV2107HP	000-878-912	10PCS
07	WOOD SCREW	3.8X13	000-861-750	4PCS
08	WOOD SCREW	4.5 X 25	000-861-753	8PCS

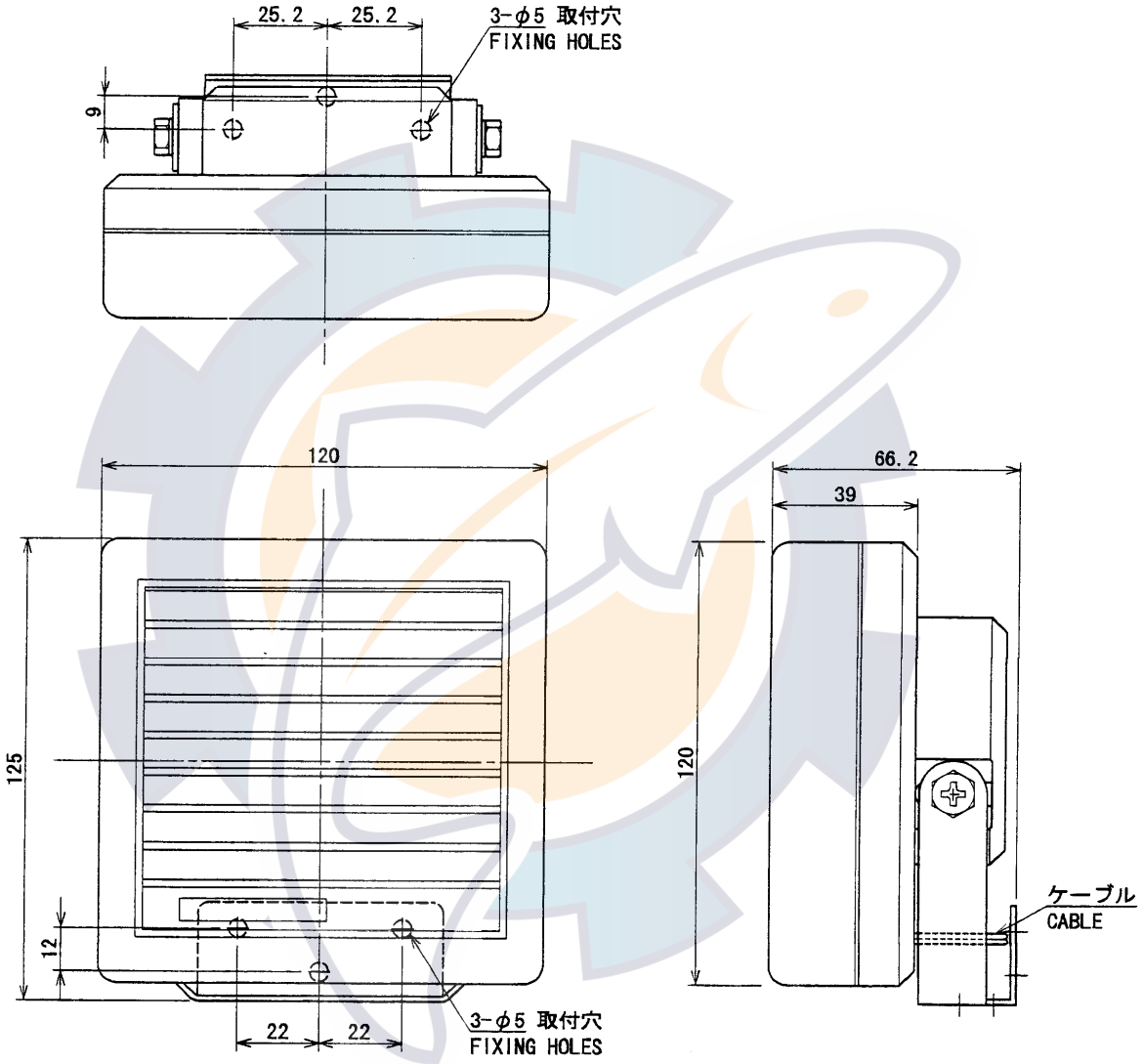
承認 APPROVED	AUG. 12. '82 K. Kawa	三角法 THIRD ANGLE PROJECTION		名称 TITLE	E-27 WHIP ANTENNA FEEDER KIT (Code No. 000-050-637)
検図 CHECKED	Aug. 11. '82	尺度 SCALE	/		
製図 DRAWN	Aug. 11. '82	重量 WEIGHT	kg	図番 DWG. NO.	E5023-038-A

FURUNO ELECTRIC CO., LTD.

FURUNO

表1 TABLE 1

寸法区分(mm) DIMENSION	公差(mm) TOLERANCE
0 < L ≦ 50	±1.5
50 < L ≦ 100	±2.5
100 < L ≦ 500	±3



注記

1）指定なき寸法公差は表1による。

NOTE

1. TABLE 1 INDICATES TOLERANCE OF DIMENSIONS.

DRAWN: May 23 '01 T. YAMASAKI		TITLE: SEM-21Q
CHECKED: May 24 '01 T. Kim		名称: スピーカ
APPROVED: May 25 '01 Y. Kim		外寸図
SCALE: 1/2 / MASS: 0.54 kg ±10%	質量は2.8mケーブルを含む MASS W/ 2.8m CABLE	NAME: LOUDSPEAKER
DWG. No.: C5016-G07- A		OUTLINE DRAWING

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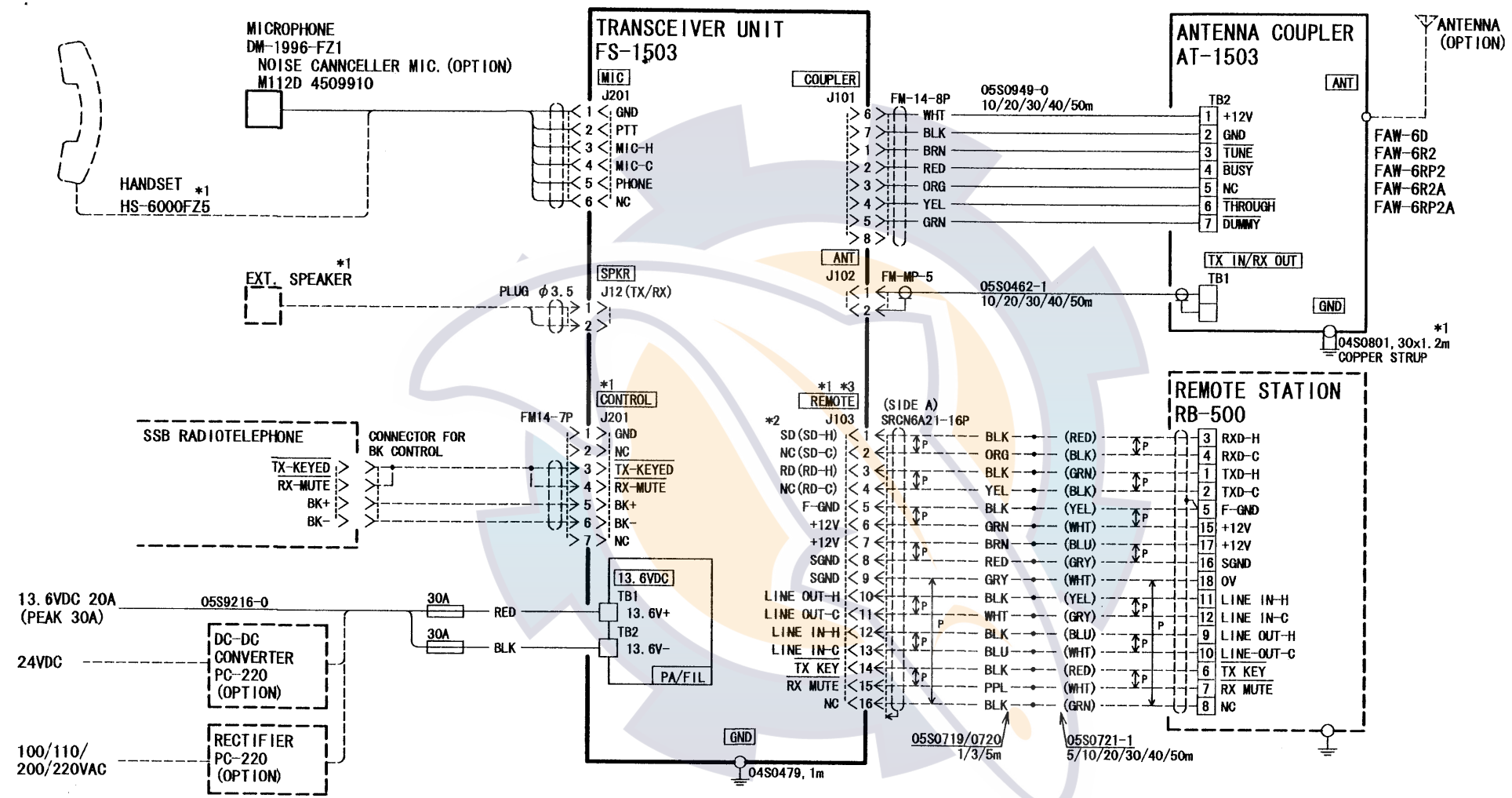


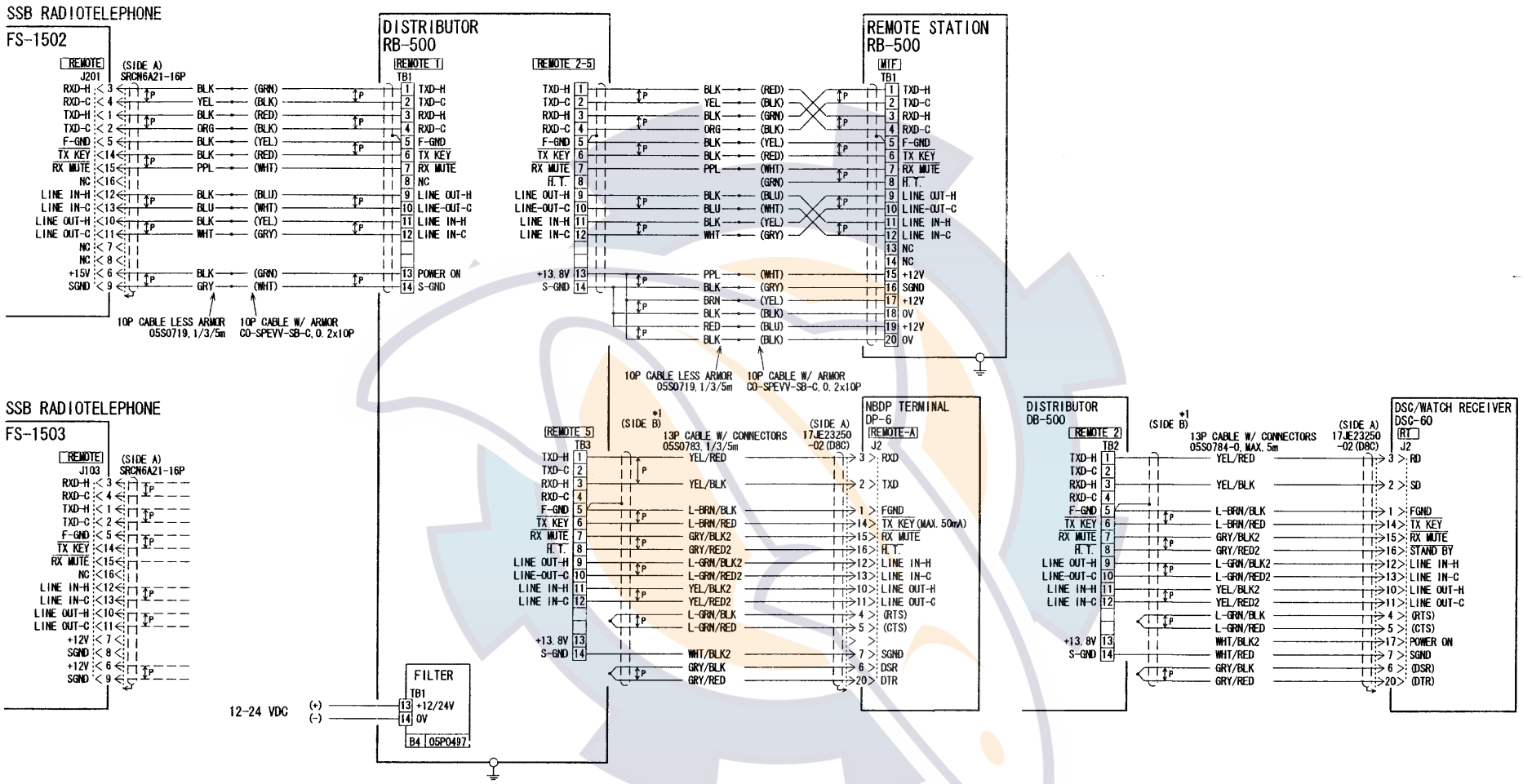
NOTE
*1. OPTIONAL SUPPLY.
*2. ( ): INDICATES SIGNAL FOR REMOTE B.
*3. STANDARD SUPPLY FOR FS-1503-A.

DRAWN Jun. 8 '01 T. YAMASAKI			TITLE FS-1503
CHECKED June 8 '01 Y. K			名称
APPROVED June 8 '01 Y. K			
SCALE	MASS kg		NAME RADIOTELEPHONE
DWG. No. E5614-C01- C			INTERCONNECTION DIAGRAM

FURUNO ELECTRIC CO., LTD.

S-1

FURUNO



注記

＊1）サイドBのコネクタを取り外す。

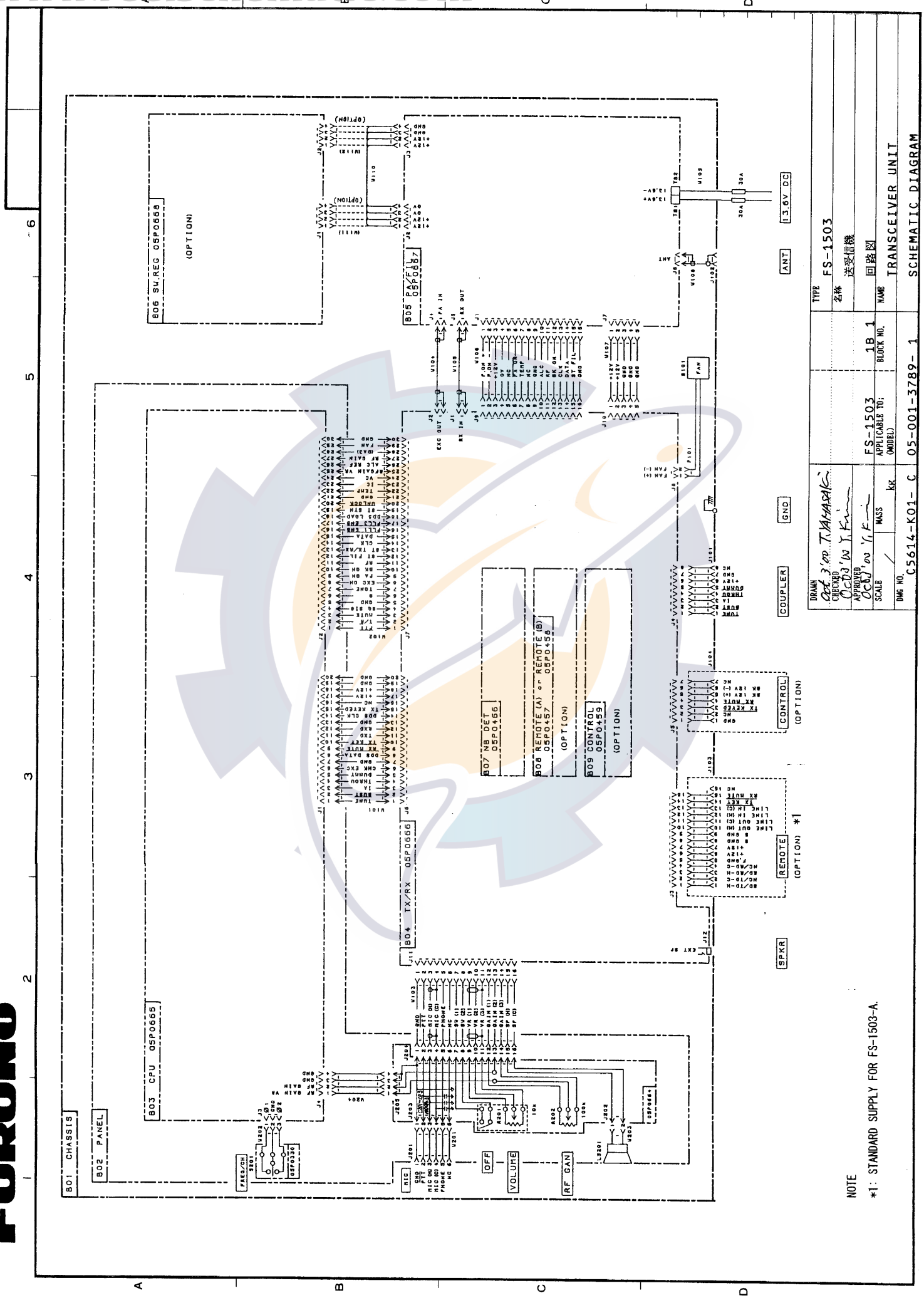
NOTE

*1. REMOVE CONNECTOR PLAG AT SIDE B.

DRAWN	Oct 3 '00 T.YAMASAKI	TITLE	FS-1502/1503 + DB-500
CHECKED	Oct 4 '00 Y.K	名称	ＳＳＢ送受信機
APPROVED	Oct 4 '00 Y.K		相互結線図
SCALE	MASS kg	NAME	SSB RADIOTELEPHONE
DWG No.	C5548-C02- F		INTERCONNECTION DIAGRAM

FURUNO ELECTRIC CO., LTD.

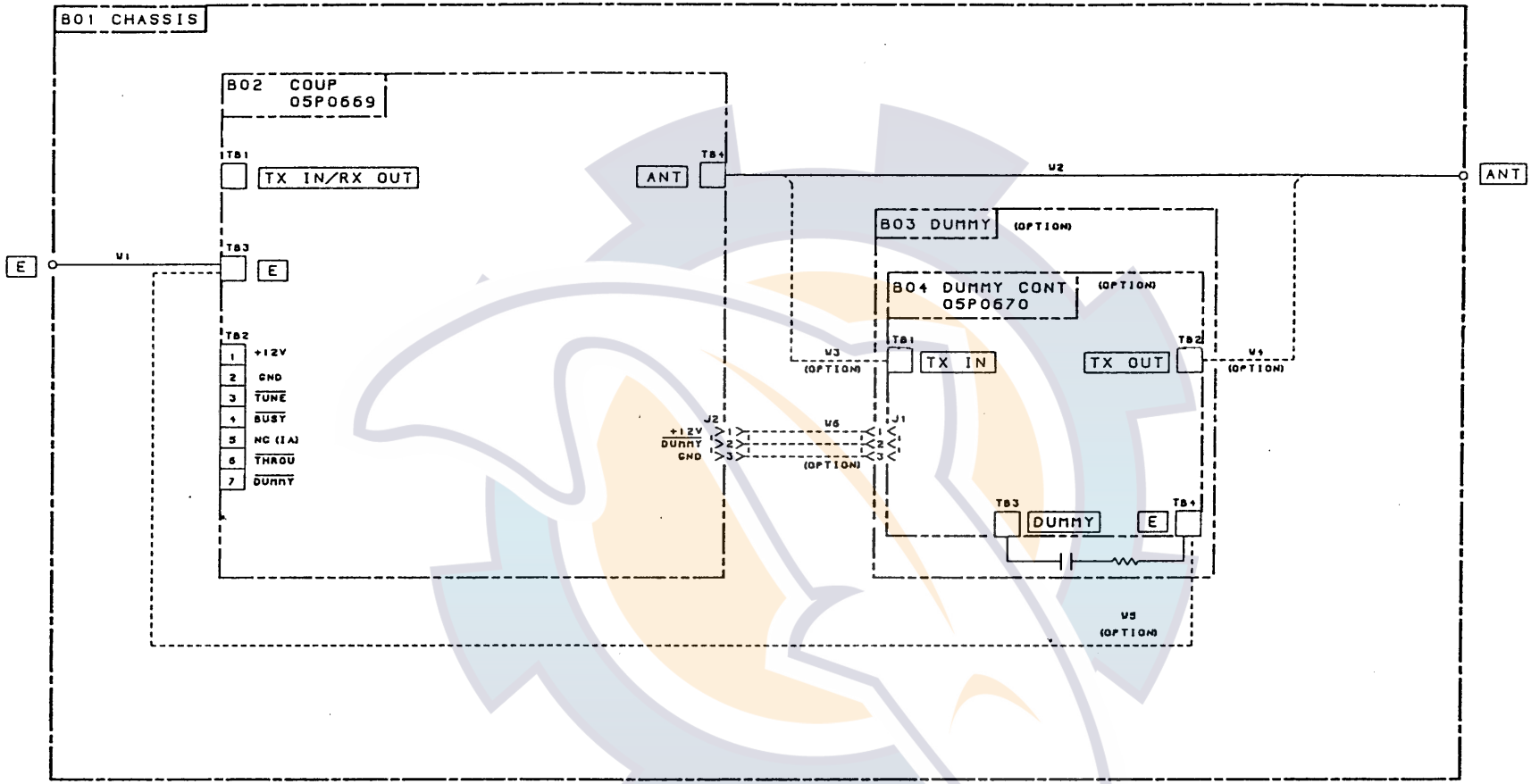
S-1A



NOTE

*1: STANDARD SUPPLY FOR FS-1503-A.

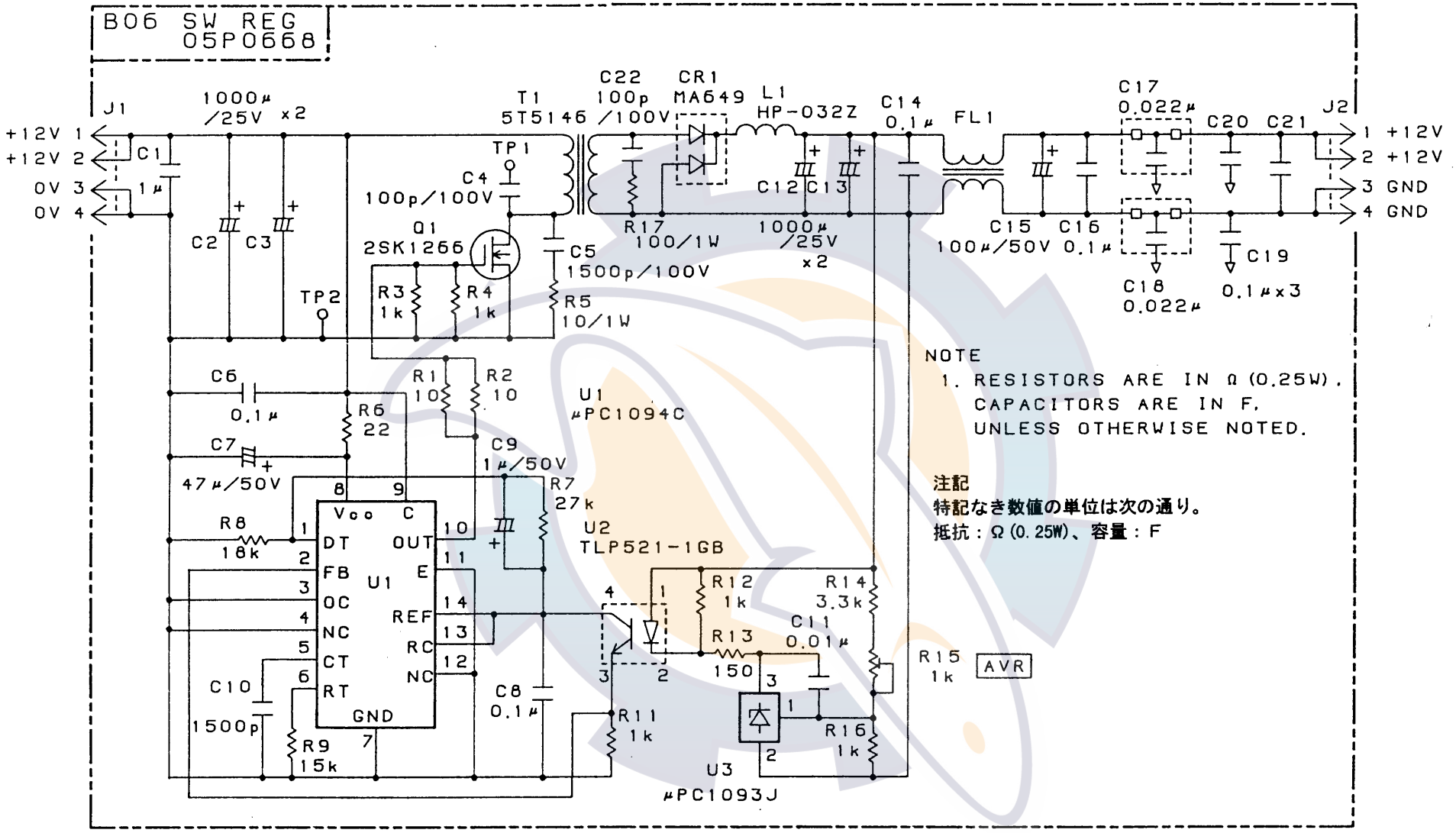
FURUNO



DRAWN Dec 5 '97 T. YAMASAKI			TYPE AT-1503
CHECKED Dec 9 '97 K. Kusumoto			名称 アンテナカプラー
APPROVED Dec 9 '97 H. Yamaguchi	FS-1503	2B 1	回路図
SCALE / MASS kg	APPLICABLE TO; (MODEL)	BLOCK NO.	NAME ANTENNA COUPLER
DWG NO. C5614-K02- A	05-001-3793- 0		SCHEMATIC DIAGRAM

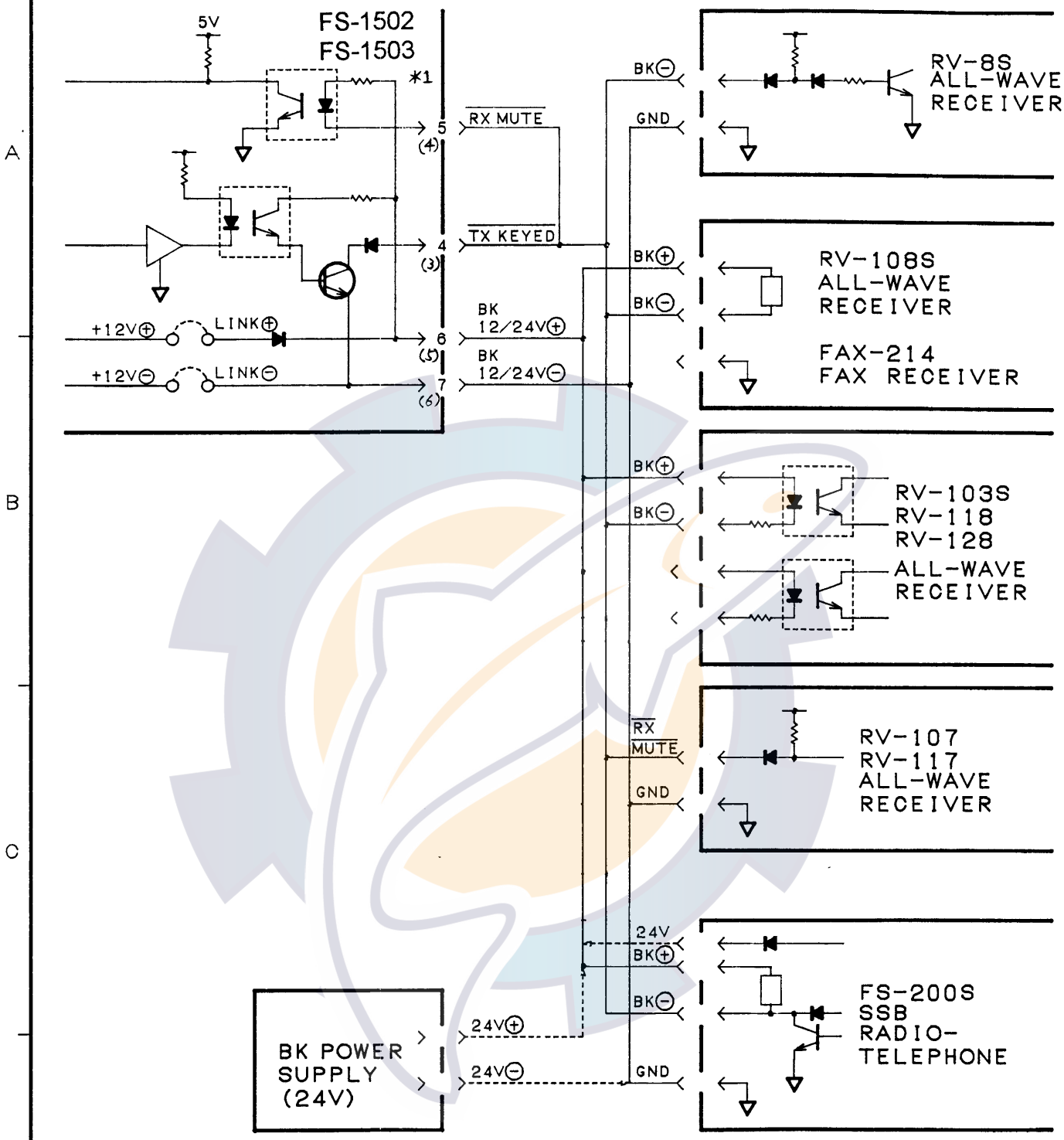
FURUNO ELECTRIC CO., LTD.

FURUNO



DRAWN Dec 5 '97 T.YAMASAKI			TYPE 05P0668
CHECKED Dec 9 '97 K.Kusunoki			名称 電源基板
APPROVED Dec 9 '97 H.Yamaguchi	FS-1503	1B 6	回路図
SCALE / MASS kg	APPLICABLE TO; (MODEL)	BLOCK NO.	NAME SW REG BOARD
DWG NO. C5614-K03- A	05-001-4400- 0		SCHEMATIC DIAGRAM

FURUNO ELECTRIC CO., LTD.

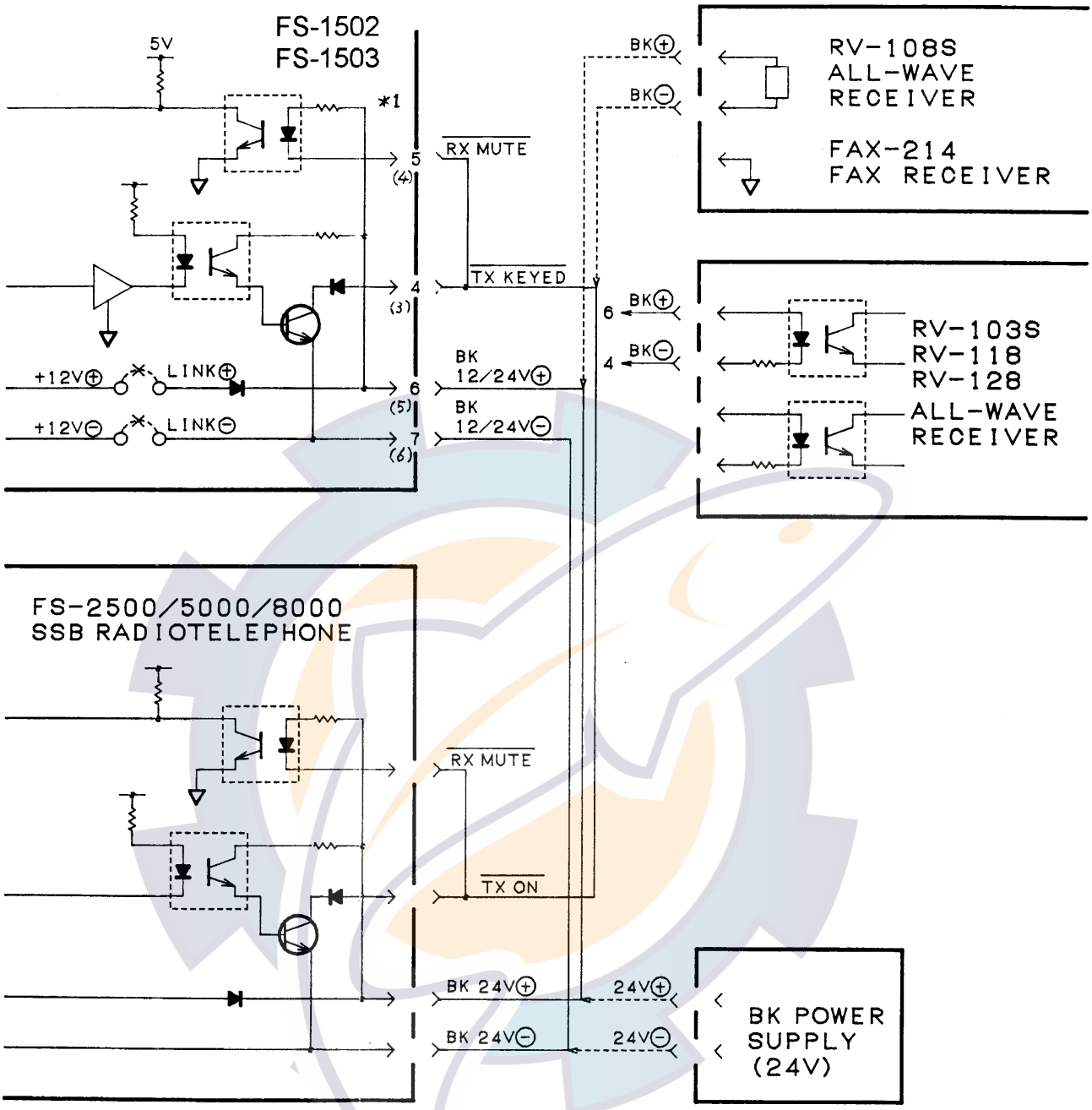


NOTE
*1. ( ) : PIN NUMBER OF FS-1503.

DRAWN: Mar. 23 '98 T. Tamsaki			TYPE
CHECKED: Mar. 23 '98 K. Kusunoki			名称
APPROVED: Mar. 23 '98 K. Kusunoki			回路図
SCALE: /	MASS: kg	APPLICABLE TO; (MODEL)	BLOCK NO.
DWG NO.: E5073-K02- B			NAME: BK CONNECTION (NEGATIVE GROUND) SCHEMATIC DIAGRAM

FURUNO ELECTRIC CO., LTD.

FURUNO



NOTE

*1. ( ): PIN NUMBER OF FS-1503.

DRAWN Nov. 23 '98 T.YAMASAICi			TYPE
CHECKED Mar 24 '98 K.Kasunoki			名称
APPROVED Mar 24 '98 K.Kasunoki			回路図
SCALE /	MASS kg	APPLICABLE TO; (MODEL)	BLOCK NO.
DWG NO. E5073-K01- B			NAME BK CONNECTION(FLOATING GROUND) SCHEMATIC DIAGRAM

FURUNO ELECTRIC CO., LTD.